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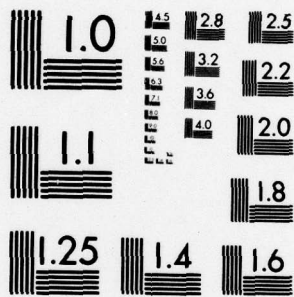
REPORT OF TEST INFANTRY TROOP TEST EXERCISE DESERT ROCK VII  
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MICROCOPY RESOLUTION TEST CHART  
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DOCUMENT IDENTIFICATION *Rock VII & VIII*

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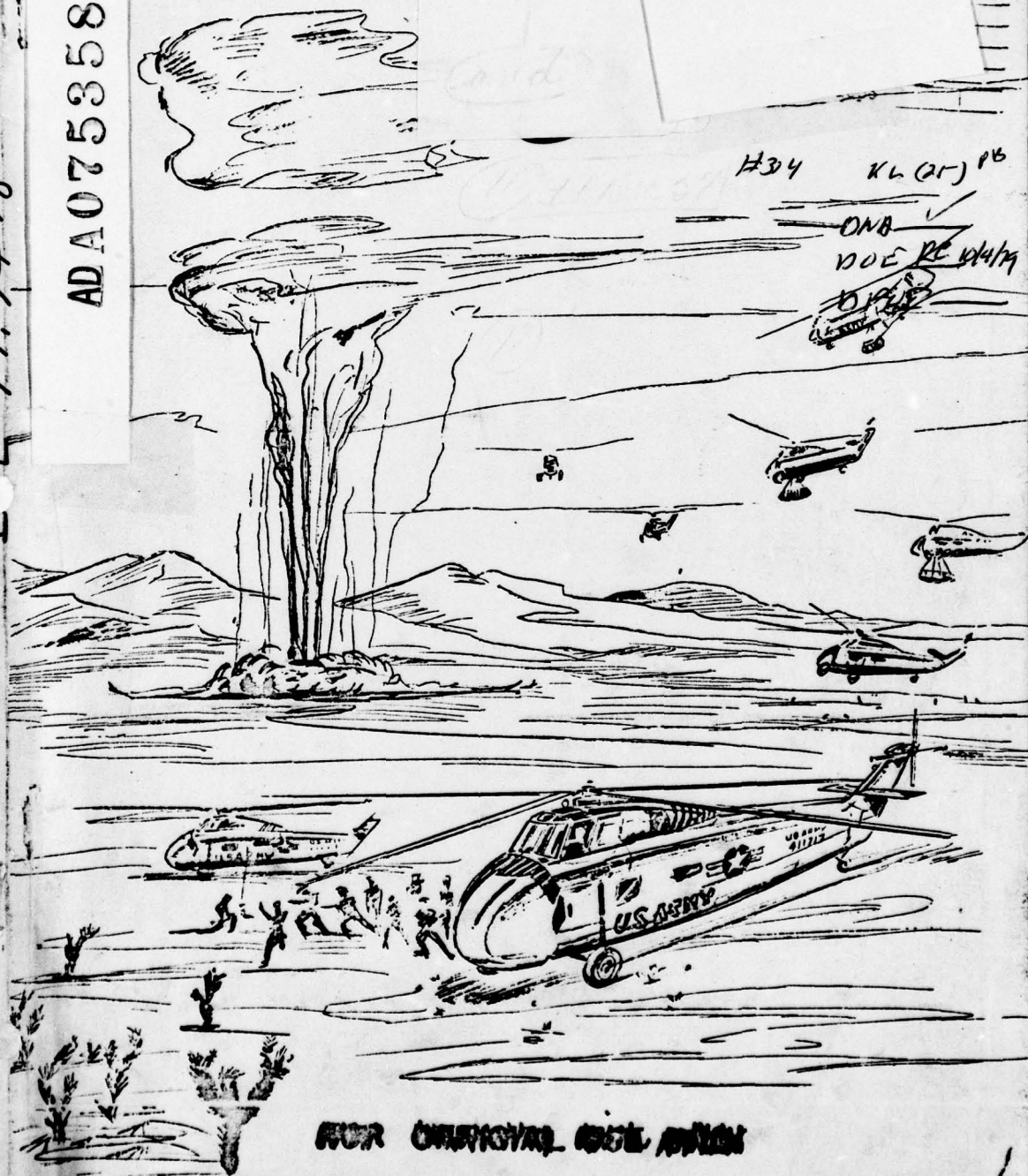
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# REPORT OF TEST INFANTRY TROOP TEST EXERCISE DESERT ROCK VII & VIII

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AMGCT-4 381 (11 Dec 57) 1st Ind  
SUBJECT: Infantry Troop Test, Exercise DESERT ROCK VII and VIII

HQ SIXTH US ARMY, Presidio of San Francisco, California, 22 Jan 58

TO: Commanding General, US Continental Army Command  
Fort Monroe, Virginia

1. Concur in general in the recommendations made by the  
Deputy Exercise Director.

2. The Troop Test conducted at Exercise DESERT ROCK VII  
and VIII forcibly pointed out the following conditions which necessitate  
a solution prior to the next Exercise DESERT ROCK:

a. It is not possible to conduct a troop test and obtain con-  
clusive results when such a test is tailored in the form of a demon-  
stration for observers and the press.

b. Due to limited state of training of participating troops  
and the many restrictions necessarily imposed by the Atomic Energy  
Commission, unrealistic and artificial requirements which preclude  
valid conclusions were imposed on the tactical maneuver at the Nevada  
Test Site.

c. When troop tests are conducted it is imperative that the  
service school promulgating the doctrine be given the specific respon-  
sibility of writing and evaluating the test as a means of determining  
the validity of new thought and concept. The assigned Exercise  
Director will be responsible for the conduct of the test.

3. In view of the experience gained at Exercise DESERT ROCK  
VII and VIII, it is imperative that the Army make every effort to obtain  
a maneuver site and low-yield tactical weapons to be utilized by an  
Army Commander to train troops and test atomic tactical doctrine  
without the inhibiting restrictions imposed by technical testing and  
instrumentation therefor. The goal would be to train and test units of  
at least the size of a Battle Group, supported by small yield atomic  
weapons. Organizations whose training culminates in a realistic  
Atomic Army Training Test would accrue the following benefits:

a. Special weapons officers and atomic delivery units  
would receive a valid test of predictions, calculations and firing data.

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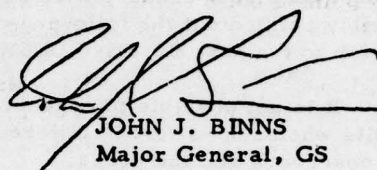
22 Jan 58

SUBJECT: Infantry Troop Test, Exercise DESERT ROCK VII and VIII

b. Commanders and radiological safety personnel would receive the training necessary to carry out their missions in combat under atomic conditions.

c. The Army would benefit in that the knowledge and the employment of atomic weapons would be more firmly entrenched as a normal tool of the soldier to be employed in successful warfare.

FOR THE COMMANDER:



JOHN J. BINNS  
Major General, GS  
Chief of Staff

1 Incl  
Final Report of  
Troop Test DR VII  
and VIII (10 copies)

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**UNDER AUTHORITY OF THE SECRETARY OF THE ARMY**



HEADQUARTERS  
EXERCISE DESERT ROCK VII and VIII  
Camp Irwin, California

AMCDR-S-3

11 December 1957

SUBJECT: Infantry Troop Test, Exercise Desert Rock VII & VIII

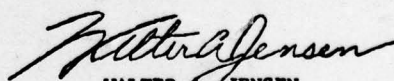
THRU: Commanding General  
Sixth United States Army  
Presidio of San Francisco, California

TO: Commanding General  
Continental Army Command  
Fort Monroe, Virginia

1. The final report of the Infantry Troop Test, Exercise Desert Rock VII and VIII, is submitted in compliance with paragraph 21, Letter AMGCT-4 354.21, Headquarters Sixth United States Army, 27 March 1957, Subject: Directive for Exercise Desert Rock VII and VIII; [and paragraph 26, Plan of Test, Infantry Battle Group, Exercise Desert Rock VII and VIII, US Army Infantry School, 5 April 1957.]

2. As conducted, the Infantry Troop Test provided realistic training of command and staff personnel in the planning and conduct of operations supported by atomic fires, familiarized troops and observer personnel with the concepts and techniques of such operations, demonstrated to the public the Army at its best, and, to a limited extent, tested and developed tactics and techniques related to atomic warfare.

3. As a demonstration, this exercise was conducted with success. From a purely test standpoint, valid evaluation of test results was precluded by the demonstrational aspects of the exercise and the artificial restrictions inherent in conducting an exercise of this type on the Nevada Test Site. Further testing of doctrine, tactics and techniques related to atomic warfare should be conducted under conditions permitting greater flexibility and latitude in planning and operations.

  
WALTER A. JENSEN  
Brigadier General, USA  
Deputy Exercise Director



REPORT OF TEST  
INFANTRY TROOP TEST  
EXERCISE DESERT ROCK VII AND VIII  
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## SECTION I - INTRODUCTION

### 1. AUTHORITY AND REFERENCES. See Annex A.

2. TEST PURPOSE. a. To determine and establish the troop support, material and equipment required to construct a defensive position adequate for protection from the effects of an atomic explosion.

b. To determine the validity of tactical doctrine, organization, planning data and helicopter requirements for the movement of a reinforced company task force, by helicopter, to seize an objective in conjunction with the use of an atomic weapon.

c. To determine the suitability of techniques and procedures to effect resupply, by helicopter, of a reinforced company task force.

3. TEST SCOPE. The test was divided into three phases, as follows:

a. Phase I - Defense Against an Atomic Explosion. A non-firing exercise in which an enemy hasty defensive position was prepared by elements of a battle group in accordance with United States organization and doctrine. The position was located within the effects radii of an atomic weapon which was detonated after the position was constructed. The participating troops were scheduled to return to the defensive position after the completion of the exercise to inspect the damage; however, this was not possible due to radioactive contamination in the area. Of primary interest in this phase of the exercise were the organization and occupation of the defensive position, the time required for the construction of the position, and the condition of the position after the detonation of the atomic weapon.

b. Phase II - Aerial Movement of a Task Force. A blank-firing exercise in which a reinforced company task force, initially disposed in a defensive area, was assembled and moved by helicopters a distance of approximately eight miles to seize an objective, in conjunction with the employment of an atomic weapon. Of primary interest during this phase were the techniques employed in the aerial movement of the task force, the tactical organization of the task force for movement, and the adequacy of techniques for employing pathfinders.

c. Phase III - Aerial Resupply of a Task Force. A blank firing exercise during which a reinforced company task force, after being moved to its objective area by helicopters (Phase II), was resupplied exclusively by helicopters until the termination of the exercise. Of primary interest during this phase were the techniques and procedures involved in the resupply of the task force by helicopter.

4. BACKGROUND. a. Infantry Troop Test, Exercise DESERT ROCK VII and VIII, was initially conceived as a test employing an infantry battalion to conduct a helicopterborne operation to seize a deep objective in conjunction with the detonation of an atomic weapon. The Commanding General, Sixth United States Army, was given the responsibility to conduct the test, provide personnel and administrative and logistical support for the test, prepare the tactical plan for implementation of the test, and render such reports as may be required. The Commandant, United States Army Infantry School, was directed to prepare the plan of test, provide technical advice and assistance in pre-test training of participating personnel, provide personnel to assist in evaluation,



and assist Commanding General, Sixth United States Army, in the preparation of the tactical plan for implementation of the test.

b. Based on guidance provided to implementing headquarters, a plan of test was prepared dividing the exercise into three phases to be conducted over a three day period. On the first day of the test, a reinforced infantry battalion was to prepare a battalion strong point (perimeter) as part of a division mobile defense, and then move to and prepare an alternate position from which the troops would observe the atomic detonation. Prior to the detonation of the atomic weapon on the initially prepared position, and enemy unit was assumed to have occupied this position. Following the detonation of the weapon and the reoccupation and consolidation of its original defensive position on the second day of the exercise, the infantry battalion was to be assembled and moved by helicopter a distance of 35 to 50 miles to seize an objective. After the battalion had been moved to the objective area, it was to establish an airhead and be resupplied exclusively by helicopters for a period of not less than two days.

c. Following the announcement of implementation of the ROCID organization, headquarters involved in the test exercise were instructed that an Infantry Division battle group would be used rather than an infantry battalion as initially planned. The Plan of Test and other orders and instructions were revised to incorporate the organizational and doctrinal changes made necessary by this decision. The revised Plan of Test was published on 5 April 1957.

d. During mid-April 1957, an initial planning conference and ground reconnaissance of the Nevada Test Site, under the direction of the Commanding General, Camp Irwin, was attended by representatives from Headquarters Sixth United States Army, United States Army Infantry School, and the participating battle group. As a result of this conference, a planning group was convened at Camp Irwin in May to develop the operation plan and the implementing directives for the test exercise. Test directives provided that participating units receive pertinent training at home stations in preparation for the exercise, and that certain additional training be conducted after arrival at Camp Desert Rock, Nevada.

e. By mid-July 1957, based upon instructions from US CONARC, the troop participation was reduced to a reinforced infantry rifle company (ROCID) task force of approximately 500 troops from Fort Lewis, Washington; a provisional helicopter battalion with one H-34 company from Fort Benning, Georgia and one H-21 company from Fort Bragg, North Carolina; and a provisional pathfinder team from XVIII Corps (Airborne). The concept provided for a scaled down defensive phase employing elements of the infantry battle group followed by an air-landed operation supported by an atomic bomb with necessary logistical play included. Primary emphasis was to be placed on portraying the Army at its best employing the ROCID organization under atomic warfare conditions. This new concept of the exercise was approved by the Commanding General, US CONARC on 22 July.

f. D-Day for the exercise was scheduled for 19 August 1957. Participating units arrived at Camp Desert Rock during the last week of July to begin pre-exercise training 29 July. The evaluator group from the Infantry School arrived 29 July whereupon detailed planning to develop the operation plan and directives required to implement the newly approved concept of exercise was begun and continued at Camp Desert Rock during the training period. The infantry task force received

*Foundation for SA1 action plans*

27 hours of instruction on air-landed operations and conducted one field problem and four rehearsals of alternate plans for the exercise. Helicopter pilots received 15 hours of proficiency training and participated in the rehearsals. The pathfinder team received 11 days of radiological training in addition to taking part in the rehearsals.

5. ORGANIZATION OF TEST UNITS. See Annex B.

6. PLANNING AND TRAINING. a. Planning. (1) Detailed planning proceeded from the basic decision that first priority be given to demonstrating the Army at its best. Secondary consideration was to be given to achieving such test and evaluation as could be effected. X In order to insure maximum availability of helicopter lift for the actual exercise, the full dress rehearsal was scheduled for 9 August thereby allowing a full week for maintenance after completion of the training phase. X As a result, it was necessary that the training of the task force, the development and coordination of the operational plans and the necessary detailed planning by the participating units proceed simultaneously.

(2) X The capabilities of helicopters in desert operations were not sufficiently known by the units to facilitate the development of detailed plans. Thus, a series of changes in all plans was precipitated, serving to draw out the planning process. Portions of plans developed were later discarded as a result of feasibility checks and rehearsals. Initial plans and orders developed by participating units portrayed a lack of appreciation of planning techniques, tactics, and unit capabilities incident to air-landed operations. Initial plans and orders were revised substantially and subsequent ones portrayed a marked improvement. Annex C, Plans and Orders Developed for Troop Test, lists the final documents published by participating units. X dated 30 VIII

(3) Requirements for close observation by news media personnel and military observers and necessary coordination with AEC caused some deviation from current tactics and techniques and necessitated virtually complete preplanning of the exercise. Planned events were compressed in time in order to insure maximum display of activities to observers. This aspect of the exercise precluded realistic appraisal of time and space factors upon which to base a test of the validity of tactics, techniques and procedures.

(4) Plans and orders of the task force and direct coordination with the helicopter battalion were accomplished by the battle group commander and staff under the direction of the Camp Desert Rock Staff. The addition of this planning task to the responsibility of the Camp Desert Rock Staff proved to be a considerable work load in addition to the normal mission of supervision, coordination, and support of numerous tests being conducted simultaneously at the Nevada Test Site. However, it was considered necessary to accomplish and coordinate the planning at this level due to the conditions and considerations discussed in sub-paragraphs 6a(1)(2) and (3), above, thus deviating from the doctrine which envisions that planning and coordination with the air transport unit will be accomplished by the unit executing the move. In a normal tactical situation, the increased capability of the rifle company to execute independent operations is a basic precept of the ROCID organization. The reinforced company size task force must be capable of planning air-landed operations if the mobile force concept of the future battlefield is to be realized in practice.

(5) For Phase I, the original plan of test called for constructing in four hours time a battle group's hasty defensive position.



The modified scope and demonstrational aspects of the exercise indicated the desirability of constructing only a representative segment of the battle group position. Since it was believed that the compact rocky terrain precluded constructing a defensive position suitable for demonstration purposes in four hours, it was decided that the troops would dig four hours for test purposes and then continue digging until such time as the position met the demonstrational requirements. No formal written plans for organizing and preparing a battle group defensive position (strong point variation) were developed for Phase I. A reconnaissance was made for the purpose of selecting sites for emplacements that would be acceptable to AEC. This selection was somewhat inhibited by AEC instrumentation which precluded digging of positions closer than 800 yards to ground zero. An attempt was then made to plan a representative array of troops and positions upon which a suitable test of the Phase I objectives could be achieved.

(6) Despite the planning aspects of the exercise which inhibited valid testing, much training value was received by all participants. Interviews with key personnel revealed a unanimity of opinion that a marked increase in planning ability was achieved during the exercise along with a better understanding and appreciation of the doctrine involved.

b. Training and Rehearsals. (1) Participating personnel of 1st Battle Group, 12th Infantry had accomplished field fortifications training for Phase I - Defense Against an Atomic Explosion - as outlined in the plan of test, prior to arrival at Camp Desert Rock. They had not, however, received the necessary air movement training and officers and NCO's were generally unfamiliar with and inexperienced in doctrine, procedures, and techniques for the planning and conduct of air-landed operations. Accordingly, after arrival of the unit at Camp Desert Rock, emphasis was placed on air movement training with particular stress on the demonstrational aspects of the exercise. During the pre-exercise training period at Camp Desert Rock, the participating task force received 27 hours of instruction on air-landed operations of which 17 hours were devoted to loading and unloading of personnel and equipment and lashing of crew-served weapons. The task force participated in one field problem involving techniques employed in helicopterborne operations and four rehearsals of alternate plans for the exercise. In addition to this training, officers and key NCO's were given a 3½ hour conference on the mechanics of planning an air-landed operation, covering planning responsibilities, planning sequence, preparation of orders and air movement forms. From the results obtained, it appeared that pre-exercise training was adequate in the following subjects:

- (a) Flight and Troop Safety.
- (b) Familiarization with Aircraft.
- (c) Loading and unloading of Aircraft.
- (d) Employment of Pathfinders.

(2) The major training deficiencies among the participating transport aviation units prior to initiation of training at Camp Desert Rock were insufficient experience in conducting helicopterborne operations of the nature envisioned in the concept of the exercise and a lack of experience in operating under desert conditions. The pre-exercise training program for the aviation units was designed to overcome these deficiencies. All personnel received indoctrination

and training in desert operations and the pilots received approximately 15 hours of proficiency training in operation at high density altitudes. Additionally, aviation personnel participated in formal instruction of task force personnel involving the use of helicopters and in all rehearsals. Prior to the conduct of the exercise, pilots had become acclimated to desert conditions and proficient in the aerial movement of troops under simulated combat conditions.

(3) The pathfinder team was highly trained in pathfinder techniques at the time of arrival at Camp Desert Rock and personnel were well versed in air-landed operations. The major deficiencies were lack of experience in handling large numbers of aircraft and in practical work in radiological reconnaissance and reporting. During the pre-exercise training period at Camp Desert Rock, members of the pathfinder team received 11 days of radiological training and took part in planning and rehearsals for the exercise.

## SECTION II - TEST OPERATIONS

7. CONDUCT OF TEST. a. Resume of Tactical Operations. (1) Phase I - Defense Against an Atomic Explosion. (a) See Appendix 2, Annex D, Photograph of Tactical Operation-Overprint.

(b) On 10 August, representatives of the Test Director's staff, Evaluator Group, and battle group staff made a ground reconnaissance to determine the area in which fortifications would be prepared. The area selected was dictated to some extent by AEC restrictions. The positions were prepared on 12 and 13 August, with a total of 7½ hours devoted to digging. Personnel from the battle group also visited the area on 14 August to improve the defensive position and to install wire communications.

(c) Fortifications prepared included positions for three rifle platoons, a weapons platoon, rifle company command post, two 4.2 inch mortars, and portions of a battle group command post. Only tools organic to the battle group were employed. No fortification materials other than a small quantity of sand bags were used. Based on photographs of the positions, observations, and interviews with participating personnel, the estimated degree of completion of all positions was 60 percent. Dimensional construction of emplacements often varied from draft Manual FM 5-15. Command post positions for platoon, company, and battle group, and wire communications thereto were not completed in the time allotted.

(d) The following factors influenced the preparation of the defensive position:

1. The terrain in which the emplacements were prepared consisted of a composition of rock and gravel, well compacted and containing sand and clay, making digging difficult. In some positions a rock shelf was encountered, requiring the selection of another position to facilitate digging. In other areas personnel encountered easier digging but in these positions rocks were rather large-up to eight inches in diameter.

2. The work progressed slowly. This was attributable in part to the heat and hard digging. Ample tools were available but distribution and utilization were inadequate. Picks and D-handled shovels were laying idle in some areas at times when they could have been used to advantage elsewhere.



(2) Phase II - Aerial Movement of a Task Force. (a) See Appendixes 1, Annex C, for discussion of Plans and Orders and OPN order 1 of Task Force Warrior.

(b) See Appendixes 1 and 2, Annex D, for Detailed Sequence of Events and Tactical Operation-Overprint.

(c) On the evening prior to the exercise, the Deputy Exercise Director instructed the participating units to prepare to execute an alternate plan due to wind direction and predicted fall-out pattern. To prepare to execute the exercise based on this change, Task Force WARRIOR initially occupied and witnessed the atomic detonation from the area indicated on the overprinted map rather than from the vicinity of BANDED MOUNTAIN at 8309 as planned. The intermediate helicopter assembly area and the loading area were changed accordingly. Transport aviation units and the pathfinder team were located in the helicopter assembly area at H-Hour (time atomic weapon was detonated).

(d) Atomic Weapon SMOKY was detonated before daylight 310530 August. At 0545 hours the pathfinder serial departed the helicopter assembly area and proceeded to the landing zone. After making a preliminary aerial radiological reconnaissance, the pathfinder serial landed at 0617 hours. Twelve minutes later the pathfinder team leader, in coordination with Rad-Safe personnel, reported that the landing zone was safe for the task force to land.

(e) At 0550 hours Task Force WARRIOR began moving on foot from its initial area to the loading area, closing in at 0605. M-Hour (time movement permissible to rear of Rad-Safe line) was announced at 0610 hours. At 0621 through 0627 hours, the air-craft designated as troop lift for the task force departed from the helicopter assembly area and landed in the intermediate assembly area beginning at 0640 hours, leaving engines running.

(f) R-Hour (objective area radiologically safe for ground operations) was announced at 0645 hours. At 0655 hours the troop lift aircraft began departing from the intermediate assembly area, landing in the loading area between 0700 and 0711 hours.

(g) The first lift, consisting of four serials carrying three rifle platoons and the weapons platoon of Company C, departed the loading area beginning at 0704 hours and arrived in the landing zone beginning at 0715. The 2nd Platoon, with an 81mm squad attached, landed at landing site VICTOR and seized Objective P4. The 3d Platoon landed at landing site ECHO and seized Objective P3. The 1st Platoon landed on Objectives P1 and P2 and seized these two objectives. All of these initial objectives were seized by 0740 hours.

(h) Two helicopters of the weapons platoon serial, carrying 81mm mortar personnel and weapons, experienced difficulty in taking off from the loading area because of being overloaded. After unloading three passengers, these two aircraft proceeded to landing site ECHO and landed nine minutes after the remainder of the serial. The mortars went into position to support the attack.

(i) In the meantime, the aircraft, having taken the troop lift in, returned to the loading area and touched down beginning at 0724 hours. The second lift consisting of five serials carrying the remainder of the task force began departing the loading area at 0731 hours. The Canadian Army Platoon landed at landing site HOTEL and seized Objective QUEEN. Elements of the reconnaissance platoon and the engineer squad

were landed at pre-designated points on the reconnaissance and security line. Two aircraft carrying Patrols #6 and #7 broke away from the reconnaissance platoon serial to land the patrols on their surveillance positions. The 4th Platoon, Company C, landed at landing site ECHO and moved into the reserve assembly area, remaining there until 0805 hours when the platoon began moving to Objectives P3 and P4 with orders to support by fire the continuation of the attack to seize Objective 2.

(j) The mortar platoon, flying in the eighth serial, departed the loading area at 0750 hours and four of the seven aircraft of this serial landed at landing site ECHO at 0757 hours. The other three aircraft of this serial, carrying three of the platoon's four 4.2 inch mortars, landed at landing site ECHO at 0815 hours after having flown to and landed at landing site HOTEL by mistake. By 0826 hours the mortar platoon was in position and settling rounds fired.

(k) The ninth serial, carrying elements of the task force headquarters, departed the loading area at 0805 hours and landed at landing site ECHO at 0814 hours. With the exception of the misrouted elements of the mortar platoon and one aircraft used to clean up personnel left in the loading area, the landing of the ninth serial completed the troop lift.

(l) Based on information received from fixed wing surveillance aircraft concerning enemy activity to the north, the task force was ordered to implement Patrols #1 through #5. Helicopters were requested to transport these patrols. Patrols #3 and #1 were briefed and dispatched in that order at 0825 and 0835 hours.

(m) At 0830 hours the task force commander ordered 2nd and 3rd Platoons, Company C, at that time located on Objectives P3 and P4, to attack to seize Objectives 2A and 2B. These platoons immediately moved to accomplish these missions and were replaced on Objectives P3 and P4 by the 4th Platoon.

(n) At 0915 hours the task force commander reported to the battle group that the 2nd and 3rd Platoons, attacking to seize Objectives 2A and 2B, had advanced to the points permitted by Rad-Safe personnel and had been halted prior to seizure of Objective 2. With the exception of resupply and evacuation missions which had been continuing since the initial landing, no other action transpired until the exercise was terminated at 0945 hours.

b. Resume of Logistical Operations. (1) Based upon the decision to reduce the exercise in scope, it was decided that the task force would be supplied by helicopter from division distributing points. Guidance as to command relationships, techniques and procedures at the echelons of command involved was lacking in the doctrinal publications applicable to the test. Therefore, the planning staff organized a system considered to be feasible within the logistical structure of the ROCID elements employed. A provisional logistic support unit was organized as shown in Appendix 4, Annex B, to represent those elements of the division involved with the aerial logistical support of the task force. An aerial supply distributing point (ASDP) with an adjacent helicopter loading site was established as the physical facility to effect aerial supply.

(2) The procedure for operation of the aerial supply system was as follows:



(a) Accompanying supplies of the task force were provided by normal ground means. Followup supply requirements, both automatic and on-call, were determined at the battle group level and forwarded by the S-4 to division G-4 section. These followup supply requirements were transmitted to Corps G-4 (Simulated) who directed the technical services (Corps was simulated to have assumed the logistical functions of the field army as in independent operations) to prepare type loads and forward them to the division ASDP. These supplies also included weapons and equipment to be used as replacement items for critical losses. The followup supplies were transported to the division ASDP where they were held mobile for loading into aircraft at any of the several loading points in the adjacent supply loading site.

(b) On-Call resupply was requested at the lowest user level, forwarded by the task force supply personnel to battle group logistical control point (LCP), thence to division G4 section, and thence to the aerial supply distributing point officer (ASDPO) for preparation and documentation of the type load requested. The ASDPO notified the G-4 section of the loading point to be used by the helicopter and instructed the loading officer to be prepared to load the helicopter on arrival. G-4 section then transmitted the requirement to the helicopter unit flight operations center (FOC) in terms of type and weight of supplies to be transported, loading point to be used, and destination of the supplies. No movements control center (MCC) was employed in the operation.

(c) As a helicopter arrived at the appointed loading point, the truck containing the appropriate type loads moved to the aircraft and the loading detail deposited the load in the helicopter or in a sling as appropriate. The loading detail provided the pilot with a copy of the cargo manifest, retaining one copy, and the helicopter departed for the destination. Upon departure of the helicopter, the ASDPO notified the G-4 section of the estimated time of arrival (ETA) of the supplies in the task force landing zone. G4 section transmitted this information to the battle group LCP where it was forwarded to the task force.

(3) The supply system and procedures employed were capable of handling all classes of supply. The ASDP contained a total of 27 tons of supplies on truck for distribution to the task force as automatic and on-call resupply. Of these supplies 2½ tons (3 sling loads) were automatic resupply, delivered on schedule as requested by the battle group for the task force. The remaining 24½ tons were prepared for delivery as on-call supplies. All supplies, except water, were simulated by the use of sand-filled boxes appropriately tagged to show weight and contents. Water was supplied using five gallon cans. Only water and simulated ammunition were actually delivered to the task force prior to the end of the problem.

(4) The on-call supplies were delivered in increments of three sling loaded aircraft plus one single sling loaded flight, transporting a total of 12,790 pounds. Ten loads of the on-call supplies were delivered during the problem. These loads were pre-scheduled in the same manner as automatic resupply in order to insure that appropriate activity would occur at precise times for observer interest.

(5) The organization and procedure established for serial logistical operations in the exercise were adequate to provide the planned support.

c. Control and Evaluation Functioning. (1) Concurrently with the preparation of the operation plan (scenario) and the control plan for the exercise, the Chief Evaluator prepared an evaluator utilization plan designed to obtain maximum use of evaluators. The evaluator utilization plan assigned evaluators down to platoon level in the participating rifle company, to company level in the transport aviation battalion, to the mortar platoon, pathfinder team, and logistical installations. One officer was assigned to the Canadian Army Platoon as controller.

(2) In addition to their primary function of evaluation, members of the Evaluator Group had additional duties as controllers during the execution of Phases II and III of the plan of test. The control plan prepared for the instruction and guidance of the Evaluator Group was designed to insure that the exercise proceeded according to the prearranged plan. It did not envision the forcing of participating units into new or unplanned situations, but, rather, it envisioned the introduction of information to units in a timely and logical manner so that action by the unit would produce the desired results in keeping with preplanned situations.

(3) Prior to and during the execution of the exercise, test data in the form of plans, orders, SOP's, and statistical information pertaining to training, planning and conduct of the exercise were requested from the participating units and Test Director Headquarters. Members of the Evaluator Group observed participating units during pre-exercise training at Camp Desert Rock and accompanied the units during rehearsals. During the execution of the exercise they remained with the unit to which assigned, observed activities pertinent to the test objectives, and maintained chronological narratives of the activities of participating units, to include statistical data as to times, distances, number of personnel, tonnages, and limiting factors. At the completion of the exercise, members of the Evaluator Group interviewed or debriefed key personnel of participating units according to a prearranged plan and collected other data essential to effective evaluation and the preparation of the report of test.

8. PRINCIPAL LIMITING FACTORS. a. The demonstrational aspects of the test exercise necessitated certain departures from doctrine which, to a considerable degree, precluded valid testing.

b. Restrictions imposed by the Atomic Energy Commission (AEC) inhibited the proper employment of forces in all phases of the test.

c. Directed changes in the purpose and scope of the exercise precluded the properly phased development and implementation of operational plans.

d. Plans for air-landing and aerial resupply and evacuation of the reinforced company size task force were developed by the battle group commander and staff in coordination with the helicopter battalion under the direction and supervision of the Camp Desert Rock staff.

e. Additional training guidance, over and above that which was listed in the test references, was also provided to the participating task force.

f. The participating units developed their plans for the air-landed operation over an extended period, correcting plans as



necessary based upon numerous rehearsals conducted on the terrain selected for the exercise.

g. Test references contain insufficient guidance covering the following aspects of the exercise:

- (1) Planning and conduct of an air-landed operation.
- (2) Pathfinder operations, training, and capabilities.
- (3) The establishment, operation and command and staff relationships of an aerial logistical system initiated and supported from the resources of a division.
- (4) Duties, responsibilities, and command and staff relationships of the Division Aviation Officer with respect to attached or supporting Army aviation units.

9. PRINCIPAL CONCLUSIONS. a. The limiting factors enumerated above seriously precluded valid testing of doctrine, techniques and procedures for air-landed operations. Consequently, based upon the results of this exercise, the feasibility of current doctrine, techniques and procedures pertaining to battle group defense (strong point variation) cannot be determined, nor can a realistic determination be made of the fortification materials, additional equipment, and time required by a battle group to prepare a defensive position (strong point variation) to protect itself against an atomic attack.

b. Under terrain and climatic conditions encountered in the Nevada Test Site, a hasty defense of the type which can be developed in four hours would not provide any suitable degree of protection to personnel and weapons against an atomic explosion of the yield and position as employed in this exercise.

c. The air-landing operations were not inhibited by comparative limitations imposed by existing weather, terrain, or conditions of visibility. However, movement into the objective area was delayed until the radiological safety of the task force personnel was assured. If existing peacetime safety criteria had not necessitated such a delay, the limited visibility in the landing zone, due to dust raised by the atomic detonation, might well have temporarily inhibited the use of helicopters in the area.

d. The functions and responsibilities pertaining to navigation and control of aircraft as outlined in Special Text 57-35-2, and as practiced in this exercise, are feasible subject to the comments made in the preceding paragraph.

e. Troop tests should not be conducted in conjunction with the detonation by the AEC of an experimental or test atomic device nor should they be superimposed upon an exercise primarily demonstrational in nature.

f. Responsibilities for the planning, preparation, conduct, support and evaluation of troop tests should be clearly and specifically defined and delineated.

g. Training of all officers and key NCO's in the planning and conduct of air-landed operations should be completed prior to commencement of unit training.

h. Increased emphasis should be placed upon unit training in air-landed operations utilizing both rotary and fixed wing aircraft.

i. Trained pathfinder units are essential to helicopter operations and training in air-landed operations.

j. Helicopter operations under desert conditions require greater emphasis on preventive maintenance.

k. The aerial logistical organization and system employed in this exercise were adequate.

l. Air-landing planning and operations are complicated by the employment of two different types of helicopters due to differences in:

- (1) Percent of time each type is out of commission.
- (2) Logistical support and maintenance.
- (3) Loading capability and technique.

m. The H-34 helicopter is better suited for troop transport of assault echelons than the H-21 helicopter.

n. Increased amplification and emphasis is required to be appended as an annex to Special Text 57-35-2 on the following:

(1) Maximum utilization of aircraft for initial airlift of assault forces.

(2) Considerations for apportioning maneuver elements and fire support to the initial assault airlift.

(3) Importance of timeliness of attack of critical objectives in the air-landed assault.

(4) Capabilities, limitations and training of Army pathfinder units.

(5) Selection and operation of landing sites.

(6) Responsibilities and measures to be employed in landing helicopters in the absence of pathfinder units for terminal guidance.

(7) Increased importance of preventive maintenance of helicopters operating under desert conditions.

(8) Capabilities and limitations of helicopters and fixed wing aircraft under atomic conditions, to include vulnerability to atomic weapons effects and operation under conditions of limited visibility that may be created by atomic fires.

(9) Necessity for detailed briefing of pilots and troop leaders as to the terrain in the objective area prior to assault.

(10) Training of selected individuals of the air-landed force in selecting and marking of landing sites and in the techniques of assisting pilots in landing aircraft and releasing cargo slings.



(11) Command and staff relationships in an aerial logistical system organized and operated by a division from its own resources.

(12) Duties, responsibilities and command and staff relationships of the Division Aviation Officer with respect to attached or supporting Army aviation units.

10. PRINCIPAL RECOMMENDATIONS. a. Troop tests should be conducted in conjunction with the detonation of either a stockpile weapon or one for which the AEC has no instrumentation requirements so as to reduce to a minimum all restrictions on troop employment.

b. Responsibility for and supervision of the preparation and evaluation of troop tests, including the rendition of final reports thereon, should be assigned to the sponsoring service school or other appropriate agency of the Army.

c. A commander and staff should be designated, and in coordination with the sponsoring agency, made responsible for training troops involved, execution of the tactical plan and rendition of required reports.

d. Responsibility for the administrative and logistical support of troop tests, including the necessary coordination with the AEC, based upon the concept and detailed plans prepared by the sponsoring agencies concerned, should remain assigned to the Exercise Director.

e. The doctrine and procedures pertaining to the battle group in defense should be subjected to further testing to include the decontamination of fortifications and the additional equipment and time required to construct positions under varied conditions to protect the battle group against atomic attack.

f. The suitability of Army airborne tactics, techniques, and procedures should be subjected to further testing.

g. Special Text 57-35-2 should be revised as provided in paragraph 9n, above.

h. A Pathfinder Team should be retained as a trained unit for further exercises and as a nucleus for training other pathfinder units.

i. Training of all officers and key NCO's in the planning and conduct of air-landed operations should be completed prior to commencement of unit training in this subject.

j. Infantry units and staffs should be given additional training in the doctrine, procedures and techniques for the planning and conduct of air-landed operations with emphasis on functions and responsibilities at all echelons of command.

### SECTION III - TEST RESULTS

11. PHASE I - DEFENSE AGAINST AN ATOMIC EXPLOSION. a. Objective  
1. To determine the fortifications and additional equipment required by a battle group in the preparation of a defensive position (strong point variation) to protect itself against an atomic explosion. (Annex E) TAB E.

b. Objective 2. To determine the adequacy of doctrine and procedures pertaining to the battle group in defense (strong point variation) (Annex F) TAB F

c. Objective 3. To determine the time required to establish a defensive position when attack is imminent. (Annex G) TAB G

12. PHASE II - AERIAL MOVEMENT OF TASK FORCE. a. Objective 1. To determine the feasibility of functions and responsibilities at all echelons of command from division down through rifle company, as set forth in Special Text 57-35-2. (Annex H) TAB H

b. Objective 2. To determine the suitability of Army airborne tactics and techniques as set forth in Special Text 57-35-2. (Annex I) TAB I

c. Objective 3. To determine the adequacy of Army pathfinder techniques as set forth in Special Text 57-35-2. (Annex J) TAB J

d. Objective 4. To determine the adequacy of training guidance set forth in Chapter 7, Special Text 57-35-2 and paragraph 9b of plan of test. (Annex K) TAB K

e. Objective 5. To determine if operations as envisioned in Special Text 57-35-2 are inhibited by the employment of two different types of cargo helicopters (H-21 and H-34). (Annex L) TAB L

f. Objective 6. To compare ground transport with aircraft as the means of transport in the exploitation phase and during the resupply phase of tactical operations. (Annex M) TAB M

13. PHASE III - AERIAL RESUPPLY OF A TASK FORCE. a. Objective 1. to determine the feasibility of command and staff logistical relationship at all echelons of command from division through company as set forth in Special Text 57-35-2 and Supplemental Logistical Instructions USAIS, Annex 4 to Plan of Test. (Annex N) TAB N

b. Objective 2. To determine whether planning techniques and requisitioning procedures as set forth in Special Text 57-35-2 and Supplemental Logistical Instructions USAIS, Annex 4 to Plan of Test are adequate to insure complete and timely logistical support to the airhead. (Annex O) TAB O

c. Objective 3. To determine the adequacy of procedures and equipment as set forth in Special Text 57-35-2 and Supplemental Logistical Instructions USAIS, Annex 4 to Plan of Test, for the receipt, preparation, ground handling and storage of supplies. (Annex P) TAB P

d. Objective 4. To determine the adequacy of procedures for helicopter transportation and distribution of automatic and on-call followup supplies as set forth in Special Text 57-35-2 and Supplemental Logistical Instructions USAIS, Annex 4 to Plan of Test. (Annex Q) TAB Q

e. Objective 5. To determine whether normal medical support, supplemented by helicopter evacuation means, provides for timely evacuation and treatment of casualties from the airhead. (Annex R) TAB R

- Annexes:
- A. Authority and References
  - B. Organization of Test Units
  - C. Plans and Orders Developed for Troop Test
  - D. Scheme of Operations Conducted
  - E. Phase I - Defense Against an Atomic Explosion - Objective 1
  - F. Phase I - Defense Against an Atomic Explosion - Objective 2
  - G. Phase I - Defense Against an Atomic Explosion - Objective 3
  - H. Phase II - Aerial Movement of a Task Force - Objective 1
  - I. Phase II - Aerial Movement of a Task Force - Objective 2
  - J. Phase II - Aerial Movement of a Task Force - Objective 3
  - K. Phase II - Aerial Movement of a Task Force - Objective 4
  - L. Phase II - Aerial Movement of a Task Force - Objective 5
  - M. Phase II - Aerial Movement of a Task Force - Objective 6
  - N. Phase III - Aerial Resupply of a Task Force - Objective 1
  - O. Phase III - Aerial Resupply of a Task Force - Objective 2
  - P. Phase III - Aerial Resupply of a Task Force - Objective 3
  - Q. Phase III - Aerial Resupply of a Task Force - Objective 4
  - R. Phase III - Aerial Resupply of a Task Force - Objective 5



**Annex A (Authority and References) to Report of Test, Infantry Troop  
Test Exercise DESERT ROCK VII and VIII**

1. Letters, CONARC, 28 Mar 56, 11 Apr 56, 15 May 56, to Commandant, The Infantry School, subject: "Preparation of Infantry Training Test (U)", CONFIDENTIAL, file ATINF 353.01 (ATT) (C).
2. Letter, CONARC, 14 May 56, to CG Sixth US Army and Commandant, The Infantry School, subject: "Conduct of Infantry Troop Test (U)", CONFIDENTIAL, file 353.01 (ATT) (C).
3. Letter, US CONARC, 11 Feb 57, to CG Sixth US Army and Commandant, US Army Infantry School, subject: "Directive for Exercise DESERT ROCK VII and VIII", file ATING-P&O 354/3.
4. Letter, Commandant, US Army Infantry School, 14 Mar 57, to CG Sixth US Army, subject: "Pretest Training of Participating Personnel - Exercise DESERT ROCK VII and VIII", file GNKEAD-R 345.
5. Letter, US CONARC, 15 Mar 57, subject: "Directive for Exercise DESERT ROCK VII and VIII", file ATING-P&O 354/3 (11 Feb 57).
6. Message, US CONARC, ATINF 38979, 19 Mar 57, "Plan of Test for Infantry Battalion, Reinforced, Exercise DESERT ROCK VII (Roman)".
7. Letter, Commandant, US Army Infantry School, 29 Mar 57, to CG Sixth US Army, subject: "Pretest Training of Participating Personnel - Exercise DESERT ROCK VII and VIII", file GNKEAD-R 345.
8. Plan of Test, Infantry Battle Group, Exercise DESERT ROCK VII and VIII (U), 5 April 57.
9. Letter, Commandant, US Army Infantry School, 1 May 57, to CG 4th Infantry Division, subject: "Pretest Training for Personnel Participating in Exercise DESERT ROCK VII and VIII", file GNKEAD-R 345.
10. Message CG 4th Infantry Division, 280001Z May 57, to Commandant US Army Infantry School, pertaining to reduced scope of pre-exercise training to be conducted at Fort Lewis.
11. Message, CG 4th Infantry Division, 011914Z Jun 57, to CG Sixth US Army, pertaining to recommended strength figures for representative battle group for participation in Exercise DESERT ROCK VII and VIII.
12. Message, CG US CONARC, 181411Z Jun 57, to CG Sixth US Army and Commandant US Army Infantry School, pertaining to reduced strength of participating troops for Exercise DESERT ROCK VII and VIII.
13. Message, CG Sixth US Army, 222353Z Jul 57, to CG US CONARC and Commandant US Army Infantry School, pertaining to approval by CG CONARC of final plans for conduct of Infantry Troop Exercise DESERT ROCK VIII.
14. Department of the Army Draft Manual, FM 5-15, Field Fortifications.
15. Department of the Army Field Manual, FM 100-5, Field Service Regulations, Operations.
16. Department of the Army Field Manual, FM 100-10, Field Service Regulations, Administration.

17. Department of the Army Field Manual, FM 101-5, Staff Officers' Field Manual, Staff Organization and Procedure.

18. Department of the Army Field Manual, FM 101-10, Staff Officers' Field Manual, Organization, Technical and Logistical Data.

19. US CONARC Training Text, TT 7-10-2, Rifle Company, Infantry Regiment.

20. US CONARC Training Text, TT 7-21-2, Headquarters, Headquarters and Service Company, Infantry Regiment.

21. US CONARC Training Text, TT-7-40-2, Infantry Regiment.

22. US CONARC Training Text, TT 7-100-2, The Infantry Division.

23. SR 320-5-1, Dictionary of United States Army Terms.

24. Special Text 57-35-2, Army Transport Aviation Combat Operations.

25. Reference Data, Infantry Division Battle Group, United States Army Infantry School.

**Annex B (Organization Test Units) to Report of Test, Infantry Troop  
Test Exercise DESERT ROCK VII and VIII**

The attached organization charts reflect the organization for planning and conduct of the troop test exercise and the composition of participating units.

- APPENDIXES:**
- 1. Test Organization Structure.**
  - 2. Organization of Task Force Warrior.**
  - 3. Organization of 3d Transportation Battalion (Helicopter) (Army).**
  - 4. Organization of Logistical Support Unit (Provisional).**



Annex C (Plans and Orders Developed for Troop Test) to Report of Test.  
Infantry Troop Test Exercise DESERT ROCK VII and VIII

1. Plans and orders comprising the exercise operation plan and implementing directive to include the battle group orders, control and evaluation plans and the operation orders of the task force and helicopter battalion for the air movement were compiled. Due to time limitations and changes in organization and concept, no written orders were developed for the hasty defense established in the defensive phase of the problem. X

2. Four separate plans for the air movement phase were developed for the task force. These plans involved two different objective areas and two different loading areas to be used in appropriate combination as dictated by AEC's predicted effects pattern of the atomic detonation as late as H-Minus three hours. Alternate Plan B was actually resorted to based upon effects prediction of AEC at H-Minus seven hours.

3. The Task Force Warrior operation order (less Annexes) written to implement Plan B is attached as Appendix 1.

APPENDIX: 1. Operation Order Number 1, Task Force Warrior to Annex C, (Plans and Orders Developed for Troop Test) to Report of Test, Infantry Troop Test Exercise Desert Rock VII and VIII.

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Appendix 1 (Operation Order 1, Task Force WARRIOR) to Annex C (Plans and Orders Developed for Troop Test) to Report of Test, Infantry Troop Test Exercise DESERT ROCK VII and VIII

CLASSIFICATION

(NOTE: This order would not normally be issued in written form.)

Copy Nr \_\_\_\_\_  
Task Force WARRIOR  
Vicinity BANDED MOUNTAIN  
(888104) NEV  
190330 August 1957  
REB

Operation Order 1

Reference: Map, NEVADA, 1:50,000, Sheets 2758 II and 2858 III

1. SITUATION.

a. Enemy Forces:

Estimated two Battalions, 41st Fusilier Regiment in the WHITEROCK SPRING-QUARTZITE AREA.

b. Friendly Forces:

- (1) 1/8 Infantry attacks to seize objectives 1 and 2.
- (2) 1/12 Infantry conducts airlanded assault with Task Force WARRIOR; supports by fire attack of 1/8 Infantry.
- (3) 3rd Transportation Battalion (Helicopter) (Army) supports airlanded operation of Task Force WARRIOR.
- (4) Annex A, Operation Overlay.

c. Attachments and detachments:

Attached: Company C, 1/12 Infantry

7th Platoon (QOR) Canadian Army

1st Platoon, Mortar Battery, 1/12 Infantry

3rd Squad, Engineer Platoon, 1/12 Infantry

Reconnaissance Platoon, 1/12 Infantry (Minus Tank Section)

Communications Detachment, 1/12 Infantry

Medical Detachment, 1/12 Infantry

2. MISSION.

TASK FORCE WARRIOR conducts airlanding vicinity WHITEROCK SPRINGS; seizes Objective PEBLES prepares to seize Objective 2; attached to 1/8 Infantry upon landing.

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3. EXECUTION.

a. Concept of operation: TASK FORCE WARRIOR lands by transport helicopter in nine (9) serials. Employing four (4) rifle platoons in assault, one (1) rifle platoon in reserve, beginning R hour 19 August, seizes Objectives PEBLES and QUEEN prepares to seize Objective 2 on order.

b. 1st Platoon:

- (1) Land in assigned sector, seize and secure Objective 1.
- (2) Revert to TASK FORCE Reserve on order.

c. 2nd Platoon:

- (1) Land in assigned sector, seize and secure Objective 3.
- (2) Be prepared to seize Objective 2B on order.

d. 3rd Platoon:

- (1) Land in assigned sector, seize and secure Objective 2.
- (2) Be prepared to seize Objective 2A on order.

e. 7th Platoon QOR:

- (1) Land on landing site HOTEL, seize and secure Objective QUEEN.
- (2) Establish security posts in TWIN PEAK AREA as indicated on overlay.
- (3) Support by fire attack on Objective 2A.

f. Reconnaissance Platoon:

Attached: 3rd Squad Engr PLT, 1/12 Infantry.

- (1) Establish reconnaissance and security posts as indicated on overlay GC 757166 to GC 764185.
- (2) Establish patrols between occupied positions, reporting to TASK FORCE Commander at thirty (30) minute intervals.

g. Weapons Platoon:

- (1) Land on landing site ECHO.
- (2) General support; priority of fires to 2nd and 3rd platoons.

h. 4th Platoon:

- (1) Land on landing site ECHO and organize as TASK FORCE RESERVE.

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(2) Be prepared to assume defense of Objectives 2 and 3 on order.

i. 1st Platoon, Mortar Battery:

- (1) Land on landing site ECHO.
- (2) General support; priority of fires to 2nd and 3rd platoons.
- (3) Annex C. Fire Support Plan.

j. TASK FORCE Headquarters (-):

- (1) Land on landing site ECHO and establish CPOP.
- (2) 3rd squad Engineer Platoon provide local security for TASK FORCE CPOP, clear mine fields on order.
- (3) Medical Detachment prepares for air evacuation of casualties; establish TASK FORCE aid station.

k. Coordinating Instructions:

- (1) Annex C, Fire Support Plan.
- (2) Annex D, Air Movement Plan.
- (3) Annex E, Air Loading Plan.
- (4) H and R hours to be announced.

4. ADMINISTRATION AND LOGISTICS.

a. Class I:

- (1) One and One-third (1 1/3) rations, individual, combat, to be carried as follows:
  - (a) 1/3 "C" ration issued each individual prior to departure.
  - (b) One (1) assault ration issued each individual prior to departure.
  - (c) 2/3 "C" ration issued each individual available, air supply, on call.

b. Waterresupply by air first 24 hours.

c. On call follow-up supplies will be available through S-4, 8th Infantry.

d. Evacuation of enemy captured material to 8th Infantry collection point after ground link-up.

e. Evacuation of casualties direct to Division Clearing Station by air.

One (1) helicopter available at Company air head at all times for evacuation.

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f. PW's to be evacuated direct to Division PW collecting point by air until ground link-up.

g. Evacuation of KIA's effected after ground link-up.

**5. COMMAND AND SIGNAL.**

a. Signal:

- (1) Index 1-1, 4th Infantry Division SOI in effect except item 20-1 and 44-1; item 20-1-DR in effect.
- (2) Yellow Rifle Smoke Grenade indicates Objective taken.
- (3) Purple Rifle Smoke Grenade indicates lift artillery fire.
- (4) Air relay in effect H hour.

b. Command: CO will move to Objective area, landing site ECHO, with second serial.

s/ Pebles  
t/ PEBLES  
CAPT

**ANNEXES:**

- \*A - Operation Overlay
- \*B - Fire Support Plan
- \*C - Air Movement Plan
- \*D - Air Loading Plan

**Distribution: Special**

**\*NOTE:** Above ANNEXES are not included in this report.

**C-14**

**CLASSIFICATION**

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Annex D (Scheme of Operations Conducted) to Report of Test, Infantry Troop  
Test Exercise DESERT ROCK VII and VIII

The attached detailed sequence of events, tactical operation - overprint, and logistical operation - schematic, reflect the scheme of operations as actually conducted during the execution of Phase II - Aerial Movement of a Task Force, and Phase III - Aerial Resupply of a Task Force.

- APPENDIXES:
1. Detailed Sequence of Events
  2. Tactical Operation - Overprint
  3. Logistical Operation - Schematic



**Appendix 1 (Detailed Sequence of Events) to Annex D (Scheme of Operations Conducted) to Report of Test, Infantry Troop Test, Exercise DESERT ROCK VII and VIII**

<u>TIME</u>	<u>EVENT</u>
0530	Atomic weapon detonated.
0535	Authority received for pathfinder serial to take off.
0545-0548	Pathfinder serial (five H-21's) departed helicopter assembly area for landing zone.
0550-0605	Task Force WARRIOR moved from initial position to loading area.
0555	G-4 attempted to contact helicopter battalion by phone. Was unable to do so. G-4 was attempting to contact helicopter battalion to check on readiness of aircraft.
0610	M-hour.
0612	G-4 called Camp Desert Rock S-3 and was advised that "M" hour had been at 0610.
0617	Pathfinder serial landed in landing zone.
0621-0627	Troop lift aircraft departed helicopter assembly area for intermediate assembly area.
0629	Pathfinder team leader reported landing zone radiologically safe for ground operations.
0640	Troop lift aircraft landed in intermediate assembly area.
0645	R-hour.
0655	Troop lift aircraft departed intermediate assembly area for loading area.
0700-0711	Troop lift aircraft landed in loading area.
0704	3rd serial (five H-34's, 1st Platoon Company C) departed loading area.
0707	1st serial (eight H-21's, 2nd Platoon Company C, 81mm Mortar Squad) departed loading area.
0709	2nd serial (six H-34's, Task Force Command Group, 3rd Platoon Company C) departed loading area.
0710	Aircraft for Patrol #3 departed helicopter assembly area.
0715	1st serial landed at landing site VICTOR.
0716	Portion of 4th serial (three H-34's, Weapons Platoon Company C minus 81mm mortar squads, reconnaissance squad) departed loading area.
0716	2nd serial landed at landing site ECHO.
0718	3rd serial landed on Objectives P1 and P2.

0720 2nd Platoon Company C completed seizure Objective P4.

0722 Remainder of 4th serial (two H-21's, two 81mm squads) departed loading area.

0723 4th serial (less two H-21's, two 81mm mortar squads) landed at landing site ECHO.

0723 1st Platoon Company C completed seizure Objectives P1 and P2.

0724 Aircraft for 5th serial landed in loading area.

0726 Aircraft for 7th serial landed in loading area.

0731 5th serial (six H-21's, Canadian Army Platoon) departed loading area.

0732 Remainder of 4th serial (two H-21's, two 81mm squads) landed at landing site ECHO.

0734 Aircraft for 8th serial landed in loading area.

0739 6th serial (five H-21's, Reconnaissance Platoon minus one squad, engineer squad, Patrols #6 and #7) departed loading area.

0740 3rd Platoon Company C completed seizure Objective P3.

0740 7th serial (six H-34's, 4th Platoon Company C, medical detachment) departed loading area.

0740 5th serial landed at landing site HOTEL.

0741 Aircraft for 9th serial landed in loading area.

0745 6th serial landed at positions on west portion of reconnaissance and security line. Two aircraft of this serial transported Patrols #6 and #7 to their surveillance positions.

0746 7th serial landed at landing site ECHO.

0750 Elements of the Reconnaissance Platoon on reconnaissance and security line ordered to withdraw to landing site ECHO to perform helicopterborne patrol missions. These personnel did not arrive at the landing site prior to termination of the exercise.

0750 8th serial (seven H-34's, Mortar Platoon) departed loading area.

0757 8th serial, less three aircraft, landed at landing site ECHO.

0757 Automatic resupply aircraft (three aircraft with sling loads) departed ASDP.

0800 Canadian Army Platoon completed seizure Objective QUEEN, moved elements to reconnaissance and security positions vicinity TWIN PEAKS.

0805 9th serial (four H-34's, elements of Task Force Headquarters) departed loading area.

0805 4th Platoon Company C ordered to move to Objectives P3 and P4, prepare to support by fire continuation of attack to seize Objective 2.



0809 Aircraft for Patrol #1 departed helicopter assembly area.

0814 9th serial landed at landing site ECHO.

0815 Remaining three aircraft of 8th serial landed at landing site ECHO; initially landed by mistake at landing site HOTEL.

0815 One H-34 with four men for landing site ECHO and four for HOTEL landed at landing site ECHO. Personnel had been left in loading area.

0818 4th Platoon Company C arrived Objectives P3 and P4.

0820 Battle Group S-4 contacted G-4 and asked when resupply planes would take off. G-4 told him automatic resupply aircraft were in the air.

0823 One H-21 landed at NEWS NOB with aggressors and casualty. Aggressors unloaded but almost immediately re-boarded the aircraft and were flown to the rear. Reason for immediate reloading was lack of observer and/or news personnel at NEWS NOB.

0825 Patrol #3 departed Objective P1 for OP #3.

0826 Mortar Platoon in position and settling rounds fired.

0827 G-4 initiated ten plane resupply.

0829 First three planes of ten plane resupply mission departed ASDP with sling loads.

0830 Task Force Commander ordered 2nd Platoon Company C to seize Objective 2B, 3rd Platoon Company C to seize Objective 2A; units moved out.

0835 Patrol #1 departed Objective P1 for OP #1.

0835 G-4 informed helicopter unit not to send all ten resupply aircraft at one time due to dust and haze in saddle through which the flight route was indicated and because of lack of space at ASDP for loading ten aircraft simultaneously.

0852 Second flight of three H-34's, with resupply departed ASDP location. The flight was delayed 20 minutes to wait for observer personnel. However, the observers did not arrive to load.

0857 Aircraft for Patrol #2 departed helicopter assembly area.

0902 Third flight of H-34's in ten plane resupply mission departed ASDP.

0903 Aircraft for Patrol #4 departed helicopter assembly area.

0905 Flight of one H-34 (last of ten plane resupply mission) departed ASDP.

0911 Aircraft for Patrol #5 departed helicopter assembly area.

0911 G-4 notified Battle Group S-4 that the last flight of ten plane resupply mission was on the way, and asked if there were any other requirements at that time. Battle Group S-4 replied in negative.

0915 Task Force Commander reported to Battle Group Commander that Objective #2 was secured up to point of advance permitted by Rad-Safe personnel.

0915 Aircraft for Patrols #2, #4 and #5 landed at landing site ECHO between 0915 and 0930 hours; patrols could not be located. These aircraft were diverted to transport VIP's at the termination of the exercise.

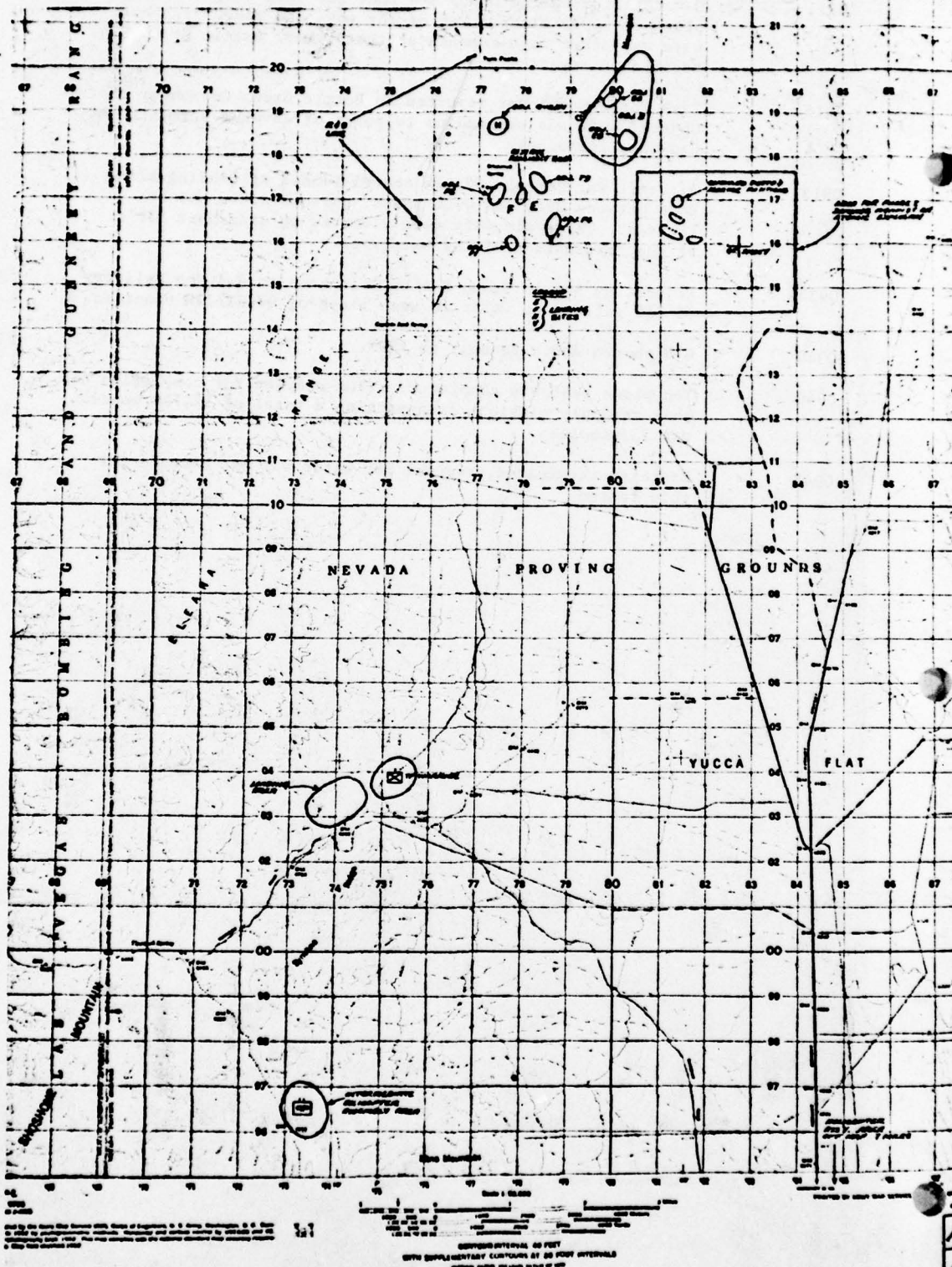
0935 Request by Battle Group S-4 by telephone to G-4 for delivery of 750 gallons of water to west slope of QUARTZITE Mountain.

0940 G-4 phoned above request to ASDP.

0940 Ten plane resupply completed. Time elapsed for completion of this resupply mission, transporting a total of 12,790 pounds, was 73 minutes.

0945 Exercise terminated, request for water was not honored for this reason.

Appendix 2 (Tactical Operation Overprint) to Annex D (Scheme of Operations)  
 Attached to Report of Test, Infantry Troop Test, Exercise DESERT ROCK VII and VIII  
 8-1-77 and 8-1-78



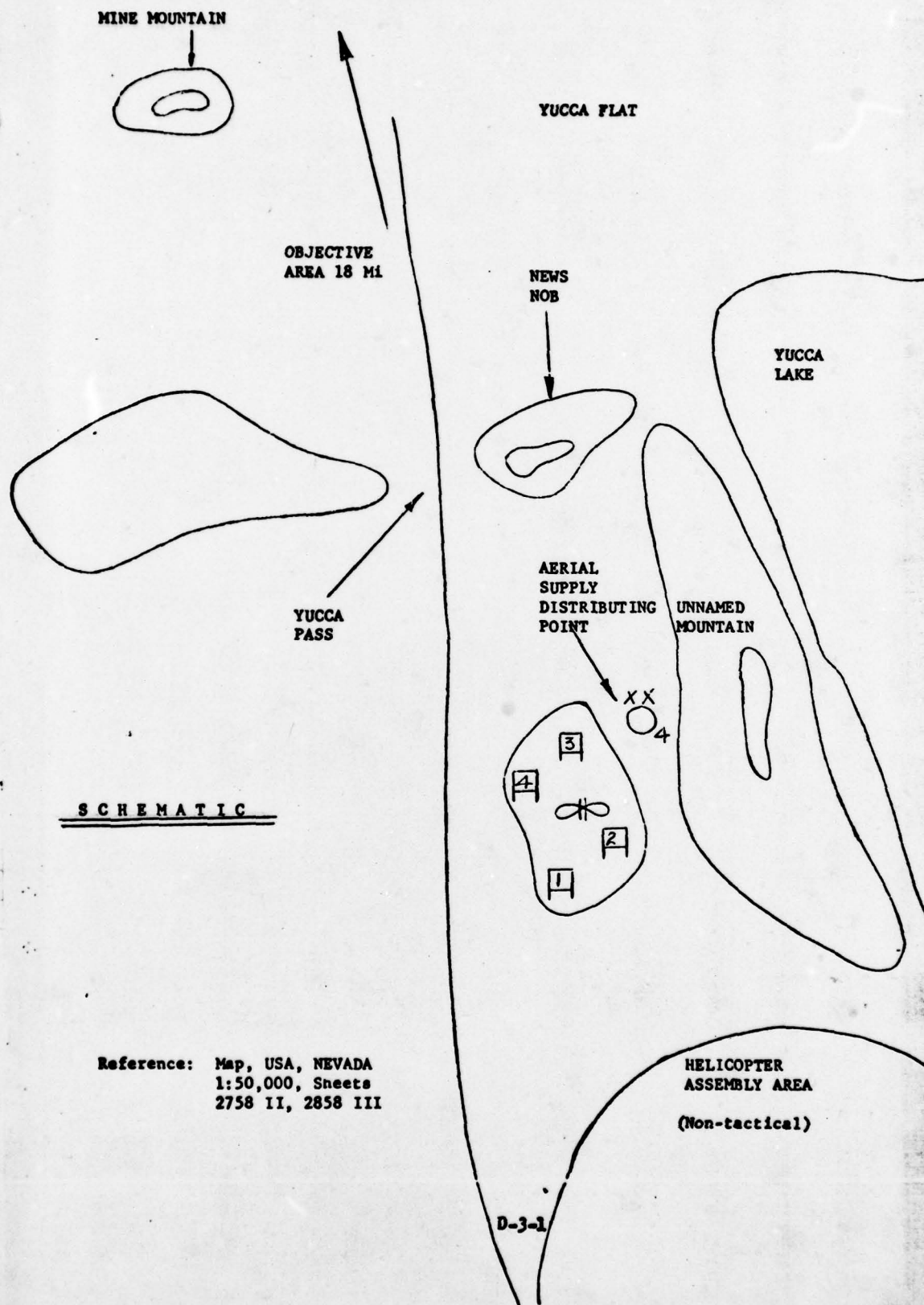
Appendix 2 (Tactical Operation Overprint)  
 to Annex D (Scheme of Operations Conducted  
 to Report of Test, Infantry Troop Test,  
 Exercise DESERT ROCK VII and VIII

D-2-1

NON CONFIDENTIAL



Appendix 3 (Logistical Operation - Schematic) to Annex D (Scheme of Operations Conducted to Report of Test, Infantry Troop Test Exercise DESERT ROCK VII and VIII



Annex E Phase I - Defense against an Atomic Explosion - Objective 1

1. OBJECTIVE. To determine the fortifications and additional equipment required by a battle group in the preparation of a defensive position (strong point variation) to protect itself against an atomic explosion.

2. TEST FACTORS. a. Organization of the Ground.

b. Utilization of Fortification Materials.

c. Utilization of Equipment.

d. Vulnerability of emplacement and installations (Shot SMOKY).

3. DISCUSSION. a. See Appendix II, Annex D for Tactical Operation Overprint.

b. See Appendix I, hereto for Detailed Plot of Defensive Area.

c. Organization of the Ground. (1) The defenses prepared included three rifle platoon positions, weapons, platoon emplacements, rifle company command post, two 4.2 inch mortar emplacements, and portions of a battle group command post. A total of 115 emplacement positions, ranging from 850 yards to 1,763 yards from ground zero were prepared.

(2) Because of limited time, no formal written plan for the battle group defense (strong point variation) was developed. In order to insure conformance with AEC restrictions, the battle group staff staked out the platoon defensive areas and issued orders for occupation of those areas. The positions were prepared under the control and supervision of the company task force commander. Distribution of troops and digging tools over the ground and commencement of preparation of emplacements initially could have been accomplished in a more coordinated manner.

(3) Dimensional construction of emplacements often varied from Draft Manual FM 5-15. Observation and interview conducted on the position revealed that participating troops were by and large not sufficiently familiar with the type emplacement assigned them. This was more evident through observation of the digging of crew served weapons emplacements. There was a general tendency to begin the digging in smaller measurements than required, resulting in hindrance because of confined space.

(4) Command and control facilities consisted of command posts at each echelon from battle group down to platoon. One mile of wire was made available to connect the command posts of battle group, company and one platoon. The wire was all laid above ground, in exposed fashion. Radios were placed in appropriate command and control facilities.

d. Utilization of Fortification Materials. This was a hasty defensive position and no fortification materials, with the exception of sandbags, were used. Material to provide revetting of emplacements was not provided. Overhead cover was not employed.

e. Utilization of Equipment. Engineer D-handled shovels and picks and individual entrenching tools were employed in preparation of positions. One bulldozer then scraped out a place for tanks to take up hull defilade positions. The ground was a composition of rock and gravel,

well compacted and containing sand and clay. Early in the digging of some positions a rock shelf was encountered, forcing abandonment of the position in favor of another location. In other parts of the area personnel encountered easy digging, requiring only their individual entrenching tools. The rocks in the easier digging were rather large, averaging eight inches in diameter, lying in loose sand deposits. For smaller weapons and individual positions, the individual entrenching tools picks and shovels were considered to be satisfactory for digging in this terrain. The intermittent rock shelves encountered generate a requirement for some type of shaped charge which can be hastily employed to break the shelves so that abandonment of the emplacement will not be necessary.

f. Vulnerability of Emplacements and Installations. (Shot SMOKY - Twice nominal yield - height at detonation, 700 feet).

(1) See Appendix I for Detailed Plot of Defensive Area.

(2) See Appendix II for Detonation Effects to Emplacements.

(3) A hasty visual survey of the area from the air and from the ground gives the initial impression that the defenses were undamaged except for a seemingly insignificant flash burning effect. Parapets appeared to be intact throughout. However, closer examination revealed the following effects upon position:

DISTANCE FROM  
GROUND ZERO

EXTENT OF DAMAGE

850-1200 yards

1. Debris in form of shattered rock and pieces of metal. Pieces of wrecked 1/4 ton jeep scattered throughout an area of approximately 1000 sq yds, center of which was 1050 yds from GZ.
2. Emplacements-parapets damaged; little debris in most positions; one contained a rock 20" in diameter; one had its weapon blown back into the emplacement; serviceability-ready for occupancy with minor improvement.
3. Vegetation-badly scorched.
4. Weapons-all machine guns displaced; some tipped over; one moved 90 degrees, one blown a distance of 10 feet; serviceability-unserviceable to doubtful. Two 106mm rifles were in the area; one furthest from GZ (1150 yds) was knocked on its side and unserviceable due to broken breach block; one nearest GZ (1000 yds) was not displaced and serviceable although scorched.
5. AN/PRC-10 Radio - undamaged except for broken antenna.

1200-1500 yards

1. Vehicles - one truck tipped over; others appeared to have suffered little damage.
2. Emplacements-suffered very little damage; small amounts of debris apparently knocked down from side away from GZ.
3. Vegetation-scorched.
4. Small amount of debris in form of scattered small rocks and pieces of vegetation throughout area.



1500-1750 yards

1. Emplacements in forward positions suffered very little damage and contained little debris (2" to 4"); weapons were not damaged; area physically ready for occupancy; vegetation scorched.
2. Emplacements in reserve position contained debris from 4" to 3' in depth; unsupported weapons displaced but appeared to be serviceable; field telephone displaced 10 feet from installation with wire and connections intact but unserviceable due to burned insulation. PRC-10 radio appeared undamaged; serviceability-Unknown.
3. Mortar emplacements had sand bags burned and spilled sand caused small amounts of debris in emplacement; no displacement of equipment or of sand bags; communication wire insulation burned and wire exposed; vegetation- badly scorched.

1750-2000 yards

1. Forward platoon area emplacements contained small amounts of debris; weapons-one unsupported tripod mounted light MG tipped over; vegetation scorched.
2. Reserve platoon area contained no damaged emplacements; weapons in place and appeared mechanically serviceable.
4. Mortar platoon emplacements had burned sand bags but no displacement of weapons and little physical damage to emplacements; communications and wire broken and segments bared to the metal due to melting and burning of insulation.

Beyond 2000 yards

No damage to Emplacements.

e. Limiting Factors. (1) Failure to utilize available personnel and equipment in the most effective manner.

(2) Variations in construction of emplacements from provisions of Draft FM 5-15.

(3) Inadequate use of available sandbags.

(4) Lack of instrumentation to determine effects of the detonation.

4. CONCLUSIONS. a. Accurate estimates of fortification materials and additional equipment required by a battle group in defense can not be made as a result of this exercise.

b. Shape charges or appropriate other demolitions are required to construct emplacements in the Nevada Test Site area.

c. Under terrain and climatic conditions encountered in the Nevada Test Site, a hasty defense of the type which can be developed in four hours would not provide any suitable degree of protection to personnel and weapons against an atomic explosion of the yield and position as employed in this exercise.

d. The total vulnerability of the defensive position to the effects of the type, yield and height of burst of the weapon used cannot be determined without benefit of instrumentation.

**5. RECOMMENDATIONS. It is recommended that,**

**a. Shape charge or other appropriate demolitions be provided to troops preparing positions in terrain such as encountered in the Nevada Test Site area.**

**b. A battle group defensive area be subjected to further testing to determine the fortifications and additional equipment required to prepare positions against atomic explosions.**

**APPENDIXES: 1. Detailed Plot of Defense Area.  
2. Detonation Effects on Emplacements.**



THE NATIONAL ARCHIVES



**Appendix 2 (Detonation Effects on Emplacements) to Annex E (Phase I - Defense Against an Atomic Explosion - Objective 1) to Report of Test, Infantry Troop Test Exercise DESERT ROCK VII and VIII**

1. **PREDETONATION EMBLACEMENT DATA.** a. Seven and one-half hours were spent in preparing the defensive positions. Completion of emplacements and individual shelters range from approximately ten percent to completed positions, not considering the use of fortification materials. Average completion overall is estimated to be approximately 60 percent. The spoil which formed the parapets contained numerous rocks ranging in size from two inches to approximately eight inches in diameter with occasional large boulders. These rocks under blast effects could present a projectile hazard to troops in holes.

b. Weapons placed in position were leaned against rocks or propped between rocks pointing to the front. Only in isolated instances were weapons sandbagged down. The condition of the weapons was generally poor, having been used in previous test detonations. Only the 106mm rifles were in good condition. Many weapons not found in the battle group were placed in position for purposes other than this test.

c. Predetonation photographs were taken of each position prepared. See Inclosure #1 for photographs representing a selective sampling of positions throughout the defensive area by type of emplacement or installation, direction from ground zero and distance from ground zero. Aerial photographs of the defensive area were taken but defective equipment rendered them unrecognizable. An Engineer survey of the defensive area was performed prior to detonation and the results were recorded on a 1:5,000 scale ozalid map as detailed position plots. See Appendix I for these detailed position plots.

2. **POST-DETONATION DATA.** a. A post-detonation analysis was conducted visually and photographs were taken of damaged positions sufficient to obtain a selective sampling of damage effects throughout the defensive area. See Inclosure #1 for photographs of damage effects. The statistics concerning the damage to emplacements, weapons and equipment are recorded on the following pages of this appendix.

3. Appendix 1 and this Appendix 2 with Inclosure 1 should be used together in reviewing the effects of detonation on the defensive area.

# BEFORE

# AFTER



50 CAL HMG, 858 YDS FROM GROUND ZERO,  
IN A 3.5 ROCKET LAUNCHER TYPE  
EMPLACEMENT.

NO  
1



DISPLACED 90°-WEAPON SCORCHED-  
PARAPET LEVELED-6" OF DEBRIS IN HOLE-  
ALL BRUSH BURNED AWAY.



50 CAL HMG, 863 YDS FROM GROUND  
ZERO, 2 MAN FOX HOLE.

NO  
2



WEAPON DISPLACED-GRIPS BURNED-  
PARAPET DESTROYED-HOLE WAS FILLED  
HALF FULL OF DEBRIS.

## FOR COMBATANT USE ONLY



50 CAL HMG, 873 YDS FROM GROUND  
ZERO, TWO MAN FOX HOLE.

NO  
4



DISPLACED & SCORCHED-2" DIRT IN  
HOLE.

TAB A to App 2 to  
Annex E  
E-2-A-1

PHOTO & PSN NO.	TYPE EMPLACE- MENT AND DIS- TANCE FR GZ	DIMENSION			PERCENT COMPLETE	TYPE WEAPON	TYPE EQUIP- MENT	WEAPON/ EQUIP- MENT CONDITION	DAMAGES
		DIA	L	W	D				
1	3.5 RL 2575 feet	54"			42"	50 Cal HMG		Poor-No tripod	MG displaced 90 degrees - weapon scorched - parapet leveled - 6" debris in hole - all brush burned away.
2	2-Man fox hole 2590 feet		72"	36"	42"	50 Cal HMG		Poor-No tripod	Parapet destroyed - weapon displaced - grips burned - hole half filled with debris.
3	2-Man fox hole 2580 feet		64"	26"	25"				No damage.
4	2-Man fox hole 2618 feet		72"	34"	57"	50 Cal HMG		Poor-No Tripod	Weapon scorched and displaced - 2 inches of dirt in hole.
5	2-Man fox hole 2662 feet		79"	24"	47"	30 Cal LMG		Poor-No tripod	Weapon partially displaced - hole half filled with debris.
6	2-Man fox hole 2717 feet		69"	27"	46"	50 Cal HMG		Poor-No tripod	Weapon scorched and displaced - fox hole two-thirds destroyed.
7	30 Cal LMG 2748 feet		72"	76"	46"	30 Cal LMG		Poor	Weapon displaced six feet - hole half filled.
8	2-Man fox hole 2825 feet		74"	30"	45"				Four inches of debris in hole - good condition.
9	2-Man fox hole 2875 feet		72"	30"	55"	30 Cal LMG		Poor-No tripod	Weapon displaced - parapet destroyed - three inches debris in hole.

ms  
4  
4  
4



# BEFORE



30 CAL LMG, (LESS TRIPOD) 887 YDS FROM GROUND ZERO, 2 MAN FOX HOLE.

# AFTER



PARTIALLY DISPLACED—HOLE HALF FILLED WITH DEBRIS.

NO  
5



30 CAL LMG, 1037 YDS FROM GROUND ZERO IN 30 CAL LMG TYPE EMPLACEMENT



DISPLACED TEN FT—TRIPOD DISPLACED 15 FT.—FOXHOLE INTACT—NO DEBRIS.

NO  
15

**FROM OVERHEAD VIEW**



30 CAL LMG, 1932 YDS FROM GROUND ZERO—2 MAN FOXHOLE



TIPPED OVER—PARAPET PARTIALLY LEVELED.

NO  
43

E-2-A-3

PHOTO & PSN NO.	TYPE EMPLACE- MENT AND DIS- TANCE FR GZ	DIMENSION			PERCENT COMPLETE	TYPE WEAPON	TYPE EQUIP- MENT	WEAPON/ EQUIP- MENT CONDITION	DAMAGES
		DIA	L	W D					
10	Platoon CP 2992 feet		72"	56"	34"	50	1-AN/ PRC 10-1 TA		Parapet destroyed - displaced equipment - broke off aerial - 4 inches debris in hole.
11	2-Man fox hole 3045 feet		73"	23"	51"	100	30 Cal LMG	Poor-No tripod	Parapet destroyed - weapon blown in fox hole.
12	2-Man fox hole 3076 feet		75"	30"	33"	50			One large rock blown in fox hole - no other damage.
13	2-Man fox hole 3060 feet		72"	25"	37"	50	30 Cal LMG	Poor-No tripod	Weapon displaced 90 degrees - two inches debris in fox hole.
14	2-Man fox hole 3100 feet		72"	25"	47"	100			Four inches debris in foxhole - good condition.
15	30 Cal LMG 3110 feet		75"	73"	44"	60	30 Cal LMG	Poor	Weapon displaced ten feet - tripod displaced fifteen feet - fox hole intact - no debris.
17	2-Man fox hole 3230 feet		73"	37"	50"	100	30 Cal BAR	Poor-No bipod	Weapon displaced - no damage to fox hole.
18	2-Man fox hole 3270 feet		75"	30"	48"	100	30 Cal LMG	Poor-No tripod	No damage.
19	2-Man fox hole 3335 feet		72"	24"	60"	30	30 Cal LMG	Poor-No tripod	Weapon scorched and displaced five inches

W 3 4 1

PHOTO & P/N NO.	TYPE EMPLACE- MENT AND DIS- TANCE FR GZ	DIMENSION			PERCENT COMPLETE	TYPE WEAPON/ EQUIP- MENT		DAMAGES
		DIA	L	W	D	TYPE WEAPON	CONDITION	
20	2-Man fox hole 3387 feet	70"	30"	42"	50	50 Cal HMG	Poor-No tripod	Weapon scorched and slightly displaced.
21	30 Cal LMG 3490 feet	70"	60"	48"	60	30 Cal LMG	Poor-No tripod	No damage.
22	1-Man fox hole 3612 feet	43"	36"	48"	60			No damage.
23	1-Man fox hole 3990 feet	36"	36"	42"	60			No damage.
25	2-Man fox hole 4120 feet	60"	36"	52"	50			No damage.
26	2-Man fox hole 4130 feet	72"	36"	36"	25			No damage.
27	2-Man fox hole 4175 feet	72"	36"	48"	50			No damage.
28	3.5 RL (2 1-Man fox hole 2 ft apart) 4235 feet	42"	36"	36"	30			No damage.

E-2-A-5



PHOTO & PSN NO.	TYPE ENPLACE- MENT AND DIS- TANCE FR GZ	DIMENSION			PERCENT COMPLETE	TYPE WEAPON	EQUIP- MENT	WEAPON/ EQUIP- MENT CONDITION	DAMAGES
		DIA	L	W	D				
29	2-Man fox hole 4325 feet	66"	48"	48"	60				No damage.
30	2-Man fox hole 4446 feet	72"	30"	42"	60				No damage.
31	2-Man fox hole 4520 feet	72"	30"	40"	50				One-two inches of dirt in fox hole.
32	1-Man fox hole 4597 feet	42"	30"	30"	25				Three inches of dirt in fox hole.
33	2-Man fox hole 4625 feet	72"	30"	42"	50				Three inches of dirt in fox hole.
34	2-Man fox hole 4940 feet	72"	36"	39"	50	50 Cal HMG	Poor-No tripod		No visible damage to weapon - four inches of dirt in fox hole.
35	2-Man fox hole 5275 feet	72"	30"	48"	60	30 Cal LMG	Poor-No tripod		Weapon tipped on side - no visible damage to fox hole.

E-2-A-6

PHOTO & PSN NO.	TYPE EMPLACEMENT AND DISTANCE FROM GZ	DIMENSION			PERCENT COMPLETE	TYPE WEAPON	TYPE WEAPON/EQUIPMENT		DAMAGES
		DIA	L	W	D		MENT	CONDITION	
36	3.5 RL (2 1-Man fox hole 2 feet apart) 5320 feet	48"	30"	30"	30"	25			Four inches of dirt in fox hole.
37	2-Man fox hole 5425 feet	72"	36"	48"		60			No damage.
38	2-Man fox hole 5485 feet	66"	30"	30"	30"	30			Three inches of dirt in fox hole.
39	2-Man fox hole 5445 feet	66"	30"	48"		50			Four inches of dirt in fox hole.
40	30 Cal LMG (Horseshoe type) 5601 feet	78"	78"	42"		50	30 Cal LMG	Poor	Three inches of dirt in fox hole. No damage to weapon.
41	2-Man fox hole 5700 feet	60"	30"	48"		60	30 Cal LMG	Poor-No tripod	Three inches of dirt in fox hole - no damage to weapon.
42	2-Man fox hole 5715 feet	72"	30"	54"		100	50 Cal LMG	Poor	Three inches of dirt in fox hole - no damage to weapon.
43	2-Man fox hole 5795 feet	66"	24"	54"		60	30 Cal LMG	Fair	Weapon tipped over - parapet partially leveled.

B-2-A-7

# BEFORE



FIELD PHONE EEB & PRC 10 RADIO,  
1502 YDS FROM GROUND ZERO—2-MAN  
FOXHOLE.

# AFTER



FIELD PHONE EEB BLOWN 10 FT—NO  
VISIBLE DAMAGE.

NO  
45



PLATOON CP EMPLACEMENT 1500  
YDS FROM GROUND ZERO.



DEBRIS FILLED FOXHOLE HALF WAY

NO  
46

## FINAL OBSERVATION AFTER EXPLOSION



50 CAL MMG (LESS TRIPOD), 1520 YDS  
FROM GROUND ZERO—2 MAN FOXHOLE.



TIPPED OVER—HANDLE KNOCKED OFF

NO  
48

E-2-A-8



PHOTO & PSN NO.	TYPE EMPLACE- MENT AND DIS- TANCE FR GZ	DIMENSION			PERCENT COMPLETE	TYPE WEAPON	TYPE WEAPON/ EQUIP- MENT		DAMAGES
		DIA	L	W	D		WEAPON	EQUIPMENT	
44	2-Man fox hole 5880 feet		72"	36"	30"	30			No damage.
45	2-Man fox hole 4507 feet		48"	30"	36"	60	Field- phone EE8 & PRC 10 Radio	New	Field-phone EE8 blown 10 feet - no visible damage.
46	Platoon CP 4500 feet	54"			54"	60			Debris filled foxhole half way.
47	2-Man fox hole 4598 feet		72"	30"	54"	100	50 Cal HMG	Poor-No tripod	Parapet leveled - four inches of debris in fox hole.
48	2-Man fox hole 4560 feet		72"	24"	48"	60	50 Cal HMG	Poor-No tripod	Weapon tipped over - handle knocked off.
49	2-Man fox hole 4598 feet		72"	24"	30"	50			No damage.
50	2-Man fox hole 4680 feet		60"	30"	30"	50	30 Cal LMG	Poor-No tripod	No visible damage.
51	2-Man fox hole 4765 feet		72"	36"	24"				No damage.

E-2-A-9

PHOTO & PSN NO.	TYPE EMPLACE- MENT AND DIS- TANCE FR GZ	DIMENSION			PERCENT COMPLETE	TYPE WEAPON	EQUIP- MENT	TYPE WEAPON/ EQUIPMENT CONDITION	DAMAGES	
		DIA	L W D							
			L	W						D
52	2-Man fox hole 4865 feet		72"	30"	72"				No damage.	
53	3.5 RL 4920 feet	60"		48"		100			No damage.	
54	Platoon Cp 4910 feet		72"	48"	30"	30			No damage.	
57	2-Man fox hole 5080 feet		66"	30"	42"	60			No damage.	
58	2-Man fox hole 5095 feet		60"	36"	66"	100	30 Cal LMG	Poor-No tripod	No visible damage.	
59	1-Man fox hole 5145 feet		42"	18"	36"	50			No damage.	
60	2-Man fox hole 5210 feet		60"	24"	48"	60			No damage.	
61	30 Cal LMG (Horseshoe type) 5240 feet		72"	72"	48"	100	30 Cal LMG	Poor-No tripod	No visible damage.	
62	1-Man fox hole 5238 feet		48"	42"	24"	60			No damage.	

E-2-A-10

BEFORE



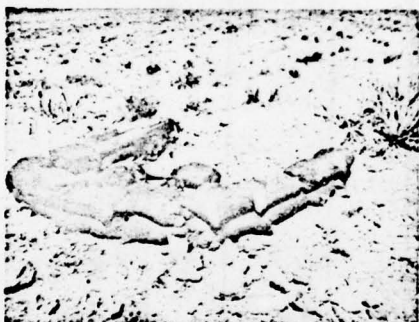
COMMAND POST, 1692 YDS FROM  
GROUND ZERO.

AFTER



NO  
80

SAND BAGS BURNED.



30 CAL LMG, 1775 YDS FROM GROUND  
ZERO, IN 30 CAL LMG (HORSE SHOE TYPE)  
EMPLACEMENT.

NO  
82



SAND BAGS BURNED - NO VISIBLE  
DAMAGE TO WEAPON.

**REAR EXTERIOR VIEW**



106mm RR (COMPLETE); MANNEQUIN W/GAS E-2-A-11  
MASK, HELMET, CANTEEN, 1150 YDS FROM  
GROUND ZERO; 106mm RR EMPLACEMENT.

T-17  
1



106mm RR DISPLACED & SCORCHED -  
VISUAL INSPECTION DETERMINED WEAPON TO  
BE SERVICEABLE; MANNEQUIN & EQUIPMENT  
DESTROYED.



PHOTO & PSN NO.	TYPE EMPLACE- MENT AND DIS- TANCE FR GZ	DIMENSION			PERCENT COMPLETE	TYPE WEAPON/		DAMAGES
		DIA	L W D			TYPE WEAPON	EQUIP- MENT CONDITION	
			L	W	D			
63	2-man fox hole 5345 feet	72"	24"	48"	60			No damage.
64		66"	30"	42"	50			No damage.
65	2-man fox hole 5350 feet	60"	24"	36"	50			No damage.
66	2-man fox hole 5344 feet	60"	30"	48"	60			No damage.
67	2-man fox hole 5480 feet	66"	36"	36"	60			No damage.
68	30 Cal LMG (Horseshoe type) 5635 feet	60"	72"	30"	60			No damage.
79	2-man fox hole 5062 feet	72"	24"	54"	100			No damage.
80	CP 5075 feet	10'		30"	50			Sand bags burned.
81	2-man fox hole 5300 feet	84"	24"	60"	100			No damage.

PHOTO & PSN NO.	TYPE EMPLACEMENT AND DIS-TANCE FR C2	DIMENSION			PERCENT COMPLETE	TYPE WEAPON	TYPE EQUIP-MENT		DAMAGES
		DIA	L	W	D		WEAPON	CONDITION	
82	30 Cal LMG (Horseshoe type) 5325 feet	60"	66"	36"	36"	100	30 Cal LMG	Fair	Sand bags burned - no visible damage to weapon.
83	4.2 Mortar 5315 feet	72"			25"	25			No damage.
84	2-1/2 in fox hole 5395 feet	75"	31"	42"	42"	60			No damage.
85	4.2 Mortar w/ammo hole 5280 feet	72"			16"	25	30 Cal LMG	Poor	No damage.
86	2-1/2 in fox hole 5300 feet	72"	36"	48"	48"	100			No damage.
87	2-1/2 in fox hole 5280 feet	72"	31"	35"	35"	60			Six inches of debris in fox hole.
88	81mm Mortar 5300 feet	84"	60"	36"	36"	60	81mm Mortar	Fair	No damage.
91	2-1/2 in fox hole 5418 feet	72"	24"	26"	26"	50			No damage.
92	2-1/2 in fox hole 5410 feet	60"	24"	30"	30"	50			No damage.

E-2-A-13

PHOTO & PSN N°.	TYPE EMPLACE- MENT AND DIS- TANCE FR GZ	DIMENSION			PERCENT COMPLETE	TYPE WEAPON	EQUIP- MENT	WEAPON/ EQUIPMENT CONDITION	DAMAGES
		DIA	L W D						
			L	W	D				
93	2-Man fox hole 5470 feet	84"	24"	60"	100				No damage.
94	Radio Oper CP 5555 feet	48"	48"	36"	60				No damage.
95	1-Man fox hole 5605 feet	52"	27"	22"	25				No damage.
96	2-Man fox hole 5702 feet	72"	36"	60"	100				No damage.
97	2-Man fox hole 5380 feet	72"	24"	36"	50				No damage.
98	2-Man fox hole 5955 feet	75"	30"	44"	60				No damage.
99	2-Man fox hole 5860 feet	72"	24"	43"	60				No damage.
100	81mm Mortar 6050 feet	96"	72"	48"	60	81mm Mortar	Fair		No damage.
101	30 Cal LMG "Y" type 5275 feet	96"	24"	36"	60	30 Cal LMC W/C	Fair		No damage.

E-24-14



PHOTO & PSN NO.	TYPE ENPLACEMENT AND DIS- TANCE FR GZ	DIMENSION			PERCENT COMPLETE	TYPE WEAPON	EQUIP- MENT	TYPE WEAPON/ EQUIPMENT CONDITION	DAMAGES
		DIA	L	W	D				
102	30 Cal LMG 5302 feet	108"		18"	18"	60			No damage.
103	2-Man fox hole 5325 feet		72"	24"	54"	100			No damage.
104	8mm mortar 5335 feet		48"	48"	36"	50			No damage.
105	2-Man fox hole 5345 feet		72"	24"	24"	50			No damage.
106	2-Man fox hole 5290 feet		78"	30"	42"	60			No damage.
107	2-Man fox hole 5390 feet		60"	30"	12"	25			No damage.
108	Co. CP Switch board - Commo Center 5403 feet		48"	24"	36"	50	Switch board		No visible damage.
109	2-Man fox hole 5450 feet		72"	30"	24"	30			No damage.
110	2-Man fox hole 5452 feet		72"	24"	54"	60			No damage.

E-2-A-25

PHOTO & PSN NO.	TYPE EMPLACE- MENT AND DIS- TANCE FR GZ	DIMENSION			PERCENT COMPLETE	TYPE WEAPON/		DAMAGES
		DIA	L	W		WEAPON	EQUIP- MENT	
111	2-Man fox hole 5520 feet	72"	29"	36"	60			No damage.
112	2-Man fox hole 5530 feet	72"	24"	48"	60			No damage.
113	2-Man fox hole 5560 feet	66"	24"	36"	50			No damage.
114	2-Man fox hole 5596 feet	66"	42"	30"	50			No damage.
115	2-Man fox hole 5635 feet	72"	24"	42"	50			No damage.
T-17 1	106mm RR (1150 yds fr GZ)	75"	75"	36"	60	106mm RR Complete w/gas	Manne- quin Mask, helmet, canteen	106mm RR displaced and scorched - visual inspection determined weapon to be serviceable. Mannequin and equip- ment destroyed.

F-2-A-16

Annex F Phase I - Defense Against an Atomic Explosion - Objective 2

1. OBJECTIVE. To determine the adequacy of doctrine and procedures pertaining to the battle group in defense (strong point variation).

2. TEST FACTORS. a. Organization of the ground.

b. Accomplishment of the mission.

c. Control.

d. Security.

e. Flexibility.

f. Mobility.

g. Fire Support.

3. DISCUSSION. a. See Appendix 2, Annex D for Tactical Operation Overprint.

b. See Appendix 1, Annex E for Detailed Plot of Defensive Area.

c. Organization of the Ground. Because of the limited time, no formal written plan was developed for a battle group defensive position (strong point variation). A representative array of forces on the terrain to portray a scaled down representation of the battle group in defense from which valid test data can be determined was attempted. Position area selection was inhibited by AEC instrumentation and a desire to locate the defense as close to ground zero as possible.

d. Accomplishment of the Mission. Due to its proximity to ground zero and the personnel casualties that would have resulted, it is estimated that the company could not have accomplished its mission after the detonation. Since this was a company defensive position, no overall battle group defense plan was developed to show positions of other forward companies, location of the battle group reserve, and the fire support available. Therefore, the adequacy of doctrine and procedures pertaining to accomplishment of the battle group mission could not be determined.

e. Control. (1) One mile of wire was laid to connect the battle group command post with the company, thence to a rifle platoon defense area. This wire was bared of its protective coating in many places by thermal radiation from the detonation, thus rendering wire communications useless.

f. Security. Security was not played in the preparation of the defense.

g. Flexibility. Flexibility to react to new situations is assisted by the development of supplementary positions, promptness of communications and ability to shift fires rapidly. The four (4) hour time factor did not permit adequate testing of alternate positions.

h. Mobility. The relative effects of mobility would favor the enemy attack until he had penetrated the positions prepared. Thereafter, it would tend to equalize because of the mountainous terrain.

i. Fire Support. Emplacements of support weapons were insufficient to insure protection to the weapons during the conduct of defense. Alternate and supplementary positions were not planned.



**j. Limiting Factors.** (1) The defensive position was limited to that of a reinforced company.

(2) Positions were not in all cases prepared in accordance with Draft FM 5-15.

**4. CONCLUSIONS.** The above limiting factors largely invalidated the basis for testing a battle group in the defense.

**5. RECOMMENDATION.** It is recommended that a battle group defensive area be subjected to further testing to determine the adequacy of doctrine and procedures for defense against atomic attack.

Annex G Phase I - Defense Against an Atomic Explosion - Objective 3

1. OBJECTIVE. To determine the time required to establish a defensive position when attack is imminent.

2. TEST FACTORS. a. Reconnaissance.

b. Preparation and Issuance of Orders.

c. Movement to the Position.

d. Organization of the Ground.

e. Utilization of Manpower.

f. Utilization of Tools and Equipment.

g. Command and Staff Supervision.

h. Experience, Training and Attitude of Troops.

3. DISCUSSION. a. See Appendixes 1 and 2, Annex E for Detailed Plot of Defensive Area and Detonation Effects on Emplacements.

b. Reconnaissance. The reconnaissance performed in this exercise consisted mainly of searching the vicinity of ground zero for position areas which would not interfere with the AEC instrumentation complex but which would be as close to ground zero as possible. Three platoon areas were selected and staked out for occupation. Additional areas were reconnoitered on the day that preparation of defense began. The reconnaissance time could not be counted against the time required to prepare the defense because of the administrative nature of its performance.

c. Preparation and Issuance of Orders. No formal written defense plans or orders were drawn up prior to preparation of the defense. Orders were issued orally in an administrative fashion to the various elements of the reinforced company to initiate the detailed selection and occupation of positions. The time taken to prepare and issue orders could not be counted against the time taken to prepare the defense.

d. Movement to the Position. Movement to and occupation of the defense area was conducted administratively. The troops were transported in trucks from Camp Desert Rock to the defensive area, requiring over two hours of travel time each way. The time taken to move and occupy the position could not be counted against the time taken to prepare the defense.

e. Organization of the Ground. (1) Positions were selected for the three rifle platoons, weapons platoon, two 4.2 inch mortars, battle group command post, and a rifle company command post.

(2) Command and control facilities included wire connecting the battle group command post with the rifle company command post, thence to a platoon defensive area. All wire was laid above ground in an exposed fashion. Radios were placed in battle group command and control facilities.

(3) No special fortification materials were utilized. Sandbags were used. No overhead cover was employed in the defensive area. Alternate, supplementary or dummy positions were not dug.

(4) Organization of the ground, if accomplished properly, has considerable impact upon the time required to prepare a defense. Security must be posted, communications must be installed and a variety of other tasks must be performed, all requiring personnel who would otherwise be free to assist in preparing individual and weapons emplacements. Since none of these other tasks were performed concurrently with preparing positions, the time taken to prepare the defensive position cannot be accepted as a valid time for computing future times required to prepare a defense under realistic conditions.

f. Utilization of Manpower. Excessive manpower was utilized in preparing many of the positions. For example, there were instances of three men assigned to dig two-man fox holes; five men digging a 3.5 Rocket Launcher position; and ten men employed at digging an 81mm mortar position. Best results were achieved by two men cooperating in the digging of a two-man fox hole or four men digging a weapons emplacement where progress was much more rapid as they spelled one another on the digging. Two days were devoted to digging of positions, during which time only 7½ hours of actual digging was accomplished. At the end of 7½ hours, the emplacements were estimated to be 60 percent completed, overall.

g. Utilization of Tools and Equipment. The tools used to prepare the positions were individual entrenching tools, D-handled shovels, and picks, all organic to the battle group. Tools did not receive maximum utilization. In several instances, picks and shovels were discarded in favor of the entrenching tools with which faster progress could be made. Conversely, in the areas of uniformly harder digging in clay binder, personnel having only entrenching tools made slow progress. The quantity of tools appeared to be adequate for the number of emplacements being dug.

h. Command and Staff Supervision. (1) As previously pointed out, no written plans for the defense were developed by the battle group. Oral instructions were given out over a period of several days. It is impractical, therefore, to attempt to comment upon the effectiveness of oral directives and instructions. The battle group elements were sufficiently instructed to occupy the general position areas assigned to them.

(2) The battle group commander and some members of his staff were involved in reconnaissance and planning for Phase II and III of the exercise, thus little overall supervision was available at the battle group level.

i. Experience, Training and Attitude of Troops. (1) The experience level of the troops was not adequately determined. Training information furnished by the battle group indicated that four hours had been devoted to fortifications training. The debriefing of key leaders of the rifle company developed estimates of training on this subject ranging from a few hours to as much as three weeks.

(2) Troop attitude was fair in this phase of the test.

j. Limiting Factors. (1) Limited utilization of manpower and equipment.

(2) Limited experience and training of troops.



4. CONCLUSION. a. Under the terrain and climatic conditions of the Nevada Test Site four hours time is insufficient to prepare a hasty defensive position which would provide any suitable degree of protection for personnel and weapons against an atomic explosion of the yield and position as employed in this exercise.

b. No valid basis for determining the time required to establish a defensive position when attack is imminent could be achieved.

5. RECOMMENDATIONS. It is recommended that the time required to establish a defensive position when attack is imminent be subjected to further testing.

Annex H Phase II - Aerial Movement of a Task Force - Objective 1 - to report of test, Infantry Troop Test Exercise DESERT ROCK VII and VIII

1. OBJECTIVE. To determine the feasibility of functions and responsibilities at all echelons of command from division down through rifle company, as set forth in Special Text 57-35-2.

2. TEST FACTORS. a. Planning.

b. Coordination and liaison.

c. Assignment and Allocation of Army Aircraft..

d. Fire Support Coordination.

e. Adequacy of Logistical Support.

f. Communications.

g. Control of Army Aircraft.

3. DISCUSSION. a. Planning. (1) The role of division was played by the Test Director Staff and was essentially limited to preparation of the exercise plan and providing direction, guidance and logistical support. Active participation during the conduct of the exercise, other than exercise control and evaluation, was limited to prearranged play.

(2) During the planning phase of the exercise, the Deputy Exercise Director Staff effected the necessary coordination with AEC and supervised the overall operation of the air landed force. The battle group staff planned the conduct of the air landed operation. It was recognized that this procedure was not in accord with doctrine contained in Special Text 57-35-2 in that the air landed force is charged with the responsibility of preparing for and executing an air landed operation. This action was necessitated by: The demonstrational aspects of the exercise; the requirement for numerous alternate plans; the fact that capabilities of helicopter in desert operations were not sufficiently known by units to facilitate the development of detailed plans; and the requirement for AEC coordination. However, since no limitations are indicated in current doctrine as to the size force (echelon) which has the capability of planning an air landed operation, it is considered that the reinforced rifle company (task force) should be capable of planning air landed operations if the mobile force concept of the future battlefield is to be realized in practice.

(3) Initial planning by the battle group and transport aviation battalion staffs under the conditions outlined in sub-paragraph (2), above, extended the planning period and resulted in revision of plans as their feasibility was checked by rehearsals. The testing of the capability of these staffs to adequately perform their functions and carry out their responsibilities in a limited period of time to permit rapid movement of a unit by helicopters in conjunction with the employment of an atomic weapon was not fully realized from the results of this exercise. Due to the level at which planning was accomplished, the feasibility of functions and responsibilities of the rifle company commander with regard to planning also cannot be determined.

b. Coordination and Liaison. Throughout the planning phase of the exercise, coordination and liaison with regard to the air landed operation were effected by the battle group staff for the task force commander.

Actual coordination and liaison between the task force and transport aviation units were essentially restricted to that accomplished during rehearsals and the conduct of the exercise. Due to the level at which coordination was effected and the time over which this took place, the capability of the battle group and rifle company commanders to complete effective and thorough coordination and liaison in a limited period of time cannot be determined from the results of this exercise.

c. Assignment and Allocation of Army Aircraft. (1) In the general situation for the exercise, one transport aviation battalion of four helicopter companies was assumed attached to the 4th Infantry Division. In operations of the nature envisioned in the concept of this exercise, it is considered that this allocation of aircraft and the aircraft (two helicopter companies) allocated to the reinforced rifle company task force (391 personnel) were adequate.

(2) Actual allocation of aircraft to the participating task force was determined by the Test Director Staff, based on the aircraft available and requirements of aircraft for administrative purposes; i.e., transport of observers and news media representatives. Allocation and assignment of aircraft to subordinate units of the task force was made by the battle group staff in coordination with the transport aviation battalion staff based on the number of aircraft available for troop lift and logistical support and the composition, equipment, and supplies of the air landed force.

(3) Due to the level at which allocation and assignment of aircraft was made, the feasibility of the rifle company commander to carry out his function and responsibilities pertaining to determination of aircraft requirements and allocation of aircraft to subordinate units cannot be determined.

d. Fire Support Coordination. The fire support plan developed by the battle group fire support coordinator for use by the task force was not properly integrated with the task force plan of maneuver and was not coordinated with the air movement plan. This lack of integration and coordination resulted from the last minute preparation of the fire support plan, after other planning had been completed. The battle group staff has the capability of preparing an adequate battle group fire support plan. Whether the rifle company commander can submit requirements for fire support and prepare an adequate fire support plan for the task force in a limited period of time cannot be determined from the results of this exercise.

e. Adequacy of Logistical Support. Logistical plans were developed by the battle group staff. One fourth basic load was carried in initially during the air landed operation. Followup supplies delivered to the task force were adequate to support the continuation of the ground operation after seizure of initial objectives; however, all followup supplies, automatic and on-call, were delivered in accordance with a preplanned schedule in furtherance of the demonstrational aspect of the exercise. Due to the procedure used for logistical support, it cannot be determined from the results of this exercise whether the task force has the capability of determining supplies and equipment required for an air landed operation and submission of necessary requests for logistical support.

f. Communications. The task force was provided with adequate communications to maintain control over subordinate units, to maintain contact with the next higher headquarters, and to otherwise perform the



functions and responsibilities of the task force during the conduct of the exercise. In addition to the communication personnel and equipment organic to the rifle company, a radio AN/GRC 19 and a 16 man detachment from the wire and radio sections, communication platoon, headquarters and headquarters company of the parent battle group were available to the task force commander during the execution of the exercise. Although some difficulty was experienced in the use of radios AN/PRC 6, radio communication was satisfactorily maintained. Except for the installation of wire by the mortar platoon, wire communication was not used.

g. Control of Army Aircraft. Due to the direct route from the loading area to landing zone, the short flight distance (approximately eight miles) and rehearsals on the actual terrain used in the exercise, no difficulties were encountered in controlling aircraft employed in troop lift or resupply missions. Overall control of aviation units was effected through the aviation battalion flight operations section located in the initial helicopter assembly area. Aircraft movements in the loading area were controlled by an air movement control officer from the transportation aviation battalion in coordination with the loading control officer from the task force. In-flight control was effected by the flight leaders from the initial point to release point and the pathfinder team from release point to landing site, through the use of air to air and ground to air radios. In addition to electronic aids, the pathfinder team facilitated navigation and control of aircraft by marking the release point with a panel code letter and smoke. Within the landing zone, each landing site was marked by a panel code letter and smoke. Panels were used and flagmen further assisted pilots in finding the exact touchdown points. As the result of detailed planning and rehearsals, the flight operations section and the pathfinder team were able to maintain excellent control of aircraft throughout the exercise, to include rapid diversion of aircraft to new missions as required.

h. Limiting factors. The following limiting factors prohibit the thorough evaluation of this objective.

(1) The battle group staff rather than the commander of the air landed force developed plans and effected necessary coordination and liaison in preparation for the conduct of the exercise.

(2) Simultaneous training, planning and coordination for the exercise were effected.

(3) The loading, air movement, and landing plans were developed with emphasis on the demonstrational aspect of the exercise.

4. CONCLUSIONS. a. Because of the special nature of this exercise, participating units could not adhere to the doctrine, procedures and techniques for the planning of air landed operations as contained in Special Text 57-35-2.

b. The feasibility of functions and responsibilities at the echelons of command taking part in this exercise cannot be determined due to the centralized nature of planning, liaison and coordination and the time used to complete plans.

c. Since plans were developed and coordination and liaison were effected at higher echelons, the capability of a reinforced company size task force to plan and conduct an air landed operation cannot be determined from the results of this exercise.

d. The communication facilities available to the air landed force were adequate to permit necessary control and coordination in the performance of functions and responsibilities of the task force commander during the conduct of the exercise.

e. The logistical support provided the air landed force was adequate; however, since the follow-up supply schedule was preplanned, the procedures used to request and obtain supplies were not in accord with doctrine contained in Special Text 57-35-2.

f. The functions and responsibilities pertaining to navigation and control of aircraft as outlined in Special Text 57-35-2 and practiced during the conduct of the exercise are feasible and the techniques used to control aircraft in flight were effective.

**5. RECOMMENDATIONS. It is recommended that:**

a. Infantry Division units and staffs be trained in the doctrine, procedures and techniques for planning and conduct of air landed operations, with emphasis on functions and responsibilities at all echelons of command.

b. The feasibility of functions and responsibilities at all echelons of command in the planning and conduct of air landed operations in accordance with current doctrine be subjected to further testing.

ANNEX I (Phase II - Aerial Movement of a Task Force - Objective 2) to  
Report of Test, Infantry Troop Test Exercise DESERT ROCK VII and  
VIII

1. OBJECTIVE:

To determine the suitability of Army airborne tactics and techniques as set forth in Special Text 57-35-2.

2. TEST FACTORS:

- a. Timeliness and simplicity of planning.
- b. Timeliness and simplicity of execution.
- c. Exploitation of unit capabilities.

3. DISCUSSION:

- a. See Appendix 1, Annex C for Operation Plan (Scenario).
- b. See Appendix 2, Annex D for Tactical Operation Overprint.
- c. Timeliness and Simplicity of Planning.

(1) Tactics and techniques are published for guiding leaders in the combat employment of their units. To determine the suitability of these guides they should be tested under conditions approximating combat as closely as possible. Consideration for time and space should be observed in both planning and execution to insure that neither too much nor too little time is given the unit to react to realistic situations. Freedom of action should be extended to the unit to the maximum extent possible. To insure that these considerations are observed, the test exercise should be prepared in advance so the unit may be properly briefed and trained to begin the exercise employing the techniques and procedures to be tested.

(2) In this exercise training and planning by participating units began simultaneously with the development of the detailed plan of exercise by the Deputy Exercise Director's staff. Conflicts between test and demonstration objectives to be met and clarification of the concept brought about new ideas and changes in scope which resulted in extending the normal time period required for the development of the exercise operation plan and implementing directives. Unit plans were affected throughout this planning period. These procedures inhibited valid testing as envisaged in the original concept of the exercise.

(3) The participating units were untrained in planning techniques and procedures. The battle group staff developed the plans for the task force operation. The first operation order developed by this staff required in excess of eight hours not considering the time required to develop alternate plans. The final order of the task force indicated a requirement for further training in techniques and procedures. Coordination of the air movement was accomplished at the battle group - helicopter battalion level. Thus, direct coordination was not achieved by the task force commander.

(4) The concept of exercise as set forth in the operation plan (scenario) envisioned multiple missions for the task force involving



changes in command relationships, all taking place in the short space of 24 hours. Plans for employment of the task force required it to conduct an air landing in the forward edge of the enemy battle area within eight hours; pass to control of another battle group; seize one of the two objectives assigned to the battle group to which attached, and operate multiple air transported reconnaissance patrols up to a distance of 60 miles to maintain surveillance over the division axis or route of advance.

(5) The duration of planning, abilities of participating units, and demonstrational aspects of the exercise render the determination of the suitability of Army airborne tactics and techniques inconclusive.

d. Timeliness and Simplicity of Execution.

(1) The doctrine envisions prompt and rapid exploitation of the effects of atomic weapons used in support of offensive operations. The air-landed operation epitomizes the capability of ROCID units to exploit the effects of nuclear weapons. The tactics and techniques involved provide for:

(a) Timely launching of the assault to gain and maintain the initiative over the enemy, thus preventing his recovery.

(b) Simplicity of execution, avoiding deviation from the essential mission to become engaged in non-essential actions.

(2) Timeliness and simplicity of execution in this operation were inhibited by the following:

(a) Restrictions imposed by AEC that engines must be shut down from H-15 minutes to H+5 minutes. The five minute delay plus additional delay occasioned by warming up cold engines prevented the pathfinder team from making a timely entry into the objective area.

(b) For safety reasons, no attempt was made to initiate the air movement of the task force into the objective area prior to receiving the Rad-Safe report from the pathfinders. Although safety considerations were paramount in this exercise, the problem of hinderance by the effects of friendly atomic weapons in air-landed combat operation must also be taken into account. These aspects of exploitation of atomic weapons by air-landed operations emphasize the necessity for multiple alternate plans for entry into the objective area. Radiation, dust, and smoke may preclude landing in close proximity to the assigned objectives and result in the necessity for landing some distance away to enter the objective area by foot movement.

(c) To provide maximum activity for spectator interest, elements of the reconnaissance platoon were loaded in two different serials, one portion on the reconnaissance and security line and the other portion with the weapons platoon in the landing zone. These elements immediately began foot movements to areas where they could be observed boarding aircraft for employment in the air-transported patrol role. Simulated casualties and prisoners of war enroute to evacuation facilities were landed to be viewed by observers, thus departing from timeliness and simplicity in execution.

(3) The task force was slow in launching the attack upon the most critical objective (Objective 2). Three rifle platoons and the weapons platoon landed in the initial lift of the task force, arriving only one or two minutes apart. Within 25 minutes these platoons had seized their

assigned objectives within the landing zone. However, the task force attack on Objective 2, the most critical terrain feature, did not materialize until 75 minutes after landing. This fact is believed to stem from the emphasis placed on insuring the security of the landing zone for a supply base. Even though neutralized by an atomic bomb, the chief threat to the landing zone was Objective 2. Thus, a prompt attack on that objective with the three platoons available would have provided better security for a supply base. In this connection, the timeliness of attack on critical objectives does not receive due emphasis in Special Text 57-35-2 with relation to other factors to be considered in the air-landed assault.

(4) The participating units attempted to employ the proper techniques for the most part. However, administrative restrictions, requirements for spectator interest and misplaced emphasis on security of the landing zone inhibited the achievement of timeliness and simplicity of execution of the air-landed assault.

**e. Exploitation of Unit Capabilities.**

(1) The tactics and techniques of air-landed operations involve the full utilization of all elements of the air-landed force on essential tasks to the full measure of their capabilities. The commander provides for full utilization of available aircraft to achieve sufficient mass to seize the objectives that are critical to his mission. He carefully weighs the balance of fire support to maneuver elements required to seize these objectives.

(2) From the standpoint of a troop test, the maximum utilization of available aircraft was not achieved in this operation. The helicopter battalion, through special maintenance effort, began the operation with an overall operational capability of about 98 percent (41 aircraft). However, many of these aircraft were required for transporting news media and observer personnel through the operational area, thus reducing the availability of aircraft to 27. Three of these were held back to transport automatic resupply for demonstrational purposes, leaving 24 for troop lift. This was ample to accomplish the short movement involved in two lifts. Under normal combat conditions, it is the collective opinion of maintenance personnel and pilots of the battalion that a 66 percent operational availability or 28 troop lift aircraft can be sustained in desert operations.

(3) Of five rifle platoons available to the task force commander, only two were employed to attack the task force objective (Objective 2). Two rifle platoons held positions in the landing zone. One of these platoons supported the attacking platoons by fire. The remaining platoon was employed on a portion of the reconnaissance and security line and also supported by fire one of the attacking platoons. Thus, three fifths of the task force maneuver strength was employed on essentially security missions, partially for demonstrational purposes.

**f. Limiting Factors.**

(1) Deviation from established tactics and techniques to satisfy the requirements of spectator interest.

(2) Planning ability of the participating units.

(3) Administrative restrictions (AEC).



#### 4. CONCLUSIONS.

a. Increased emphasis is required in Special Text 57-35-2 on the following:

(1) Maximum utilization of aircraft for initial air lift of assault forces.

(2) Considerations for apportioning maneuver elements and fire support to the initial assault air lift.

(3) Importance of timeliness of attack of critical objectives in the airlanded assault.

b. The suitability of Army airborne tactics and techniques as set forth in Special Text 57-35-2 could not be properly tested in this exercise and should be subjected to further testing.

#### 5. RECOMMENDATIONS.

a. Special Text 57-35-2 be revised to place increased emphasis on the following:

(1) Maximum utilization of aircraft for initial air lift of assault forces.

(2) Considerations for apportioning maneuver elements and fire support to the initial assault air lift.

(3) Importance of timeliness of attack on critical objectives in the air landed assault.

b. The suitability of Army airborne tactics be subjected to further testing.



ANNEX J (Phase II - Aerial Movement of a Task Force - Objective 3) to  
Report of Test, Infantry Troop Test Exercise DESERT ROCK VII  
and VIII

1. OBJECTIVE:

To determine the adequacy of Army pathfinder techniques as set forth in Special Text 57-35-2.

2. TEST FACTORS:

- a. Organization, equipment, and capabilities.
- b. Timeliness of reporting information.
- c. Effectiveness of navigation and control of aircraft.
- d. Assistance rendered to tactical operations.

3. DISCUSSION:

- a. Organization, Equipment, and Capabilities.

(1) The pathfinder team was a provisional unit organized, trained, and equipped especially for this exercise. It consisted of trained parachutists from the 101st and 82nd Airborne Divisions. The team was organized in accord with the pathfinder team organization set forth in Special Text 57-35-2 for helicopterborne operations, with the exception that two officers were substituted for two enlisted men in the team. The organization was adequate to perform missions of the scope set forth in Special Text 57-35-2. See Appendix 1, Pathfinder Team Organization.

(2) The equipment of the pathfinder team was procured from various units of the two airborne divisions (See Appendix 2, Pathfinder Team Equipment). Radiological equipment used in this exercise consisted of one dosimeter per man, one film badge per man, and five AN/PDR39/TIB (Ion Chambers), all furnished locally.

(3) The mission of the pathfinder team was developed in a planning conference between the helicopter unit and battle group planners. The mission included the manning and operation of five landing sites, whereas Special Text 57-35-2 envisioned a capability of manning and operating only three sites. The number of landing sites was subsequently reduced to four. Manning and operation of four sites still overtaxed the pathfinder team. This raises the question of how many pathfinders are needed to conduct a helicopterborne operation of battle group size.

(4) Paragraph 54b, Special Text 57-35-2, provides that in terrain which does not restrict the landing of helicopters, the size of landing sites is determined by the number and formation of helicopters landing on them. The terrain in the landing zone selected for this operation was open and relatively free of obstacles with a series of low hills which provided reference points for pilots. Adequate space for landing large numbers of helicopters was available. However, landing planes were based upon a decision to land the infantry units on or in the immediate vicinity of their initial objectives. Therefore the movement was divided into platoon serials of four to eight aircraft to be delivered from one to eight minutes apart.

(5) One platoon serial landed on the reconnaissance and security line after the flight leader received an azimuth heading from

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the pathfinder control center. No landing site party was present to assist in this landing. There appears to be no plausible reason that this procedure cannot be employed for landings within designated landing zones. Limited availability of pathfinders may require that this procedure be employed, particularly on objectives which are somewhat isolated from the main assault force. The effectiveness of the procedure will depend upon the extent to which pilots and troop commanders are briefed on the terrain in the objective area.

(6) Special Text 57-35-2 does not include the need for considering the availability and capabilities of pathfinders in selecting and determining the number of landing sites. In addition, proper emphasis is not given to landings conducted in situations where no pathfinders are present.

b. Timeliness of Reporting Information.

(1) The pathfinder serial was forced to deviate from its proposed flight path because of a dense smoke and dust cloud which lay between it and the objective area. Taking advantage of a west wind which was beginning to move the cloud back in the direction of ground zero, the flight flew around the cloud and landed in an eastern approach, on appointed landing sites under conditions of visibility that did not exceed 800 yards. The control center was promptly established and radiological reconnaissance of all landing sites was begun immediately. Visibility did not permit the establishment of the designated release point for a period of 30 minutes after the pathfinder landings, and the release point was not in operation until after the first serial landed. Within 12 minutes of pathfinder landings, the landing zone was determined to be safe for landing the task force and was so reported back to the task force. It is considered that the reconnaissance and reporting could not have been achieved in less time. For precautionary reasons ground Rad-Safe personnel accompanied the pathfinders to the landing sites to render additional coverage if needed. However, the pathfinder personnel, by virtue of their training at Fort McClellan and Camp Desert Rock, could have accomplished the radiological reconnaissance equally as well without assistance.

(2) Full understanding of the techniques, procedures, and capabilities of the team and the aggressiveness of the team members resulted in timely reporting of information concerning visibility, radiation, and the enemy situation in the objective area despite the adverse conditions of visibility which hampered their operation initially.

c. Effectiveness of Navigation and Control of Aircraft.

(1) The distance of the flight from loading area to landing sites was only eight miles. Therefore, flight leaders were able to make contact with the pathfinder control center immediately after taking off, and there was no requirement for establishment of intermediate air control points. Despite the fact that the release point was not in operation upon the arrival of the first serial the control center effectively talked the serial to its proper landing site. Succeeding serials were handled according to plan. Landing site parties marked the sites with panels. Colored smoke was used to assist the flight leaders into the landing sites. Flags were used by site NCO's to designate the touchdown point of the flight leader's aircraft.

(2) No difficulty was experienced in control of aircraft on the ground. There was more than adequate space for landing the number of helicopters that were contained in any of the serials. There was adequate air space in the landing zone to permit closely timed arrival

(3) To combat these conditions, extra emphasis was placed on maintenance and especially on the thoroughness of the daily inspections performed by crew members. The scope of these inspections was expanded to in-



and departure of aircraft at any point. Aircraft for the evacuation of casualties and prisoners of war were promptly diverted from serials of the second lift by the pathfinders as requested by the task force commander.

**d. Assistance Rendered to Tactical Operations.**

(1) The field master at the landing sites assisted in guiding troops to their appointed assembly areas or in the general direction of their objectives. This is considered to be the most important assistance that can be rendered to the task force ground operation by the pathfinder personnel.

(2) The pathfinder team also assisted in the landing and routing of supplies from landing sites to the unit areas. Some supply loads were to be delivered to attacking platoons in areas not manned by pathfinder personnel. In one instance there was confusion in smoke signals caused by such signals being fired in different areas simultaneously. The resupply aircraft, carrying a sling load of supplies to an attacking platoon, approached the landing zone; then, the pilot withdrew and circled to determine where he could drop the supplies. As the helicopter approached again, a member of the platoon to be supplied attempted to land it with hand signals; however, the pilot could not understand the signals and again withdrew. Having noticed the confusion, the pathfinder control center took over and talked the aircraft into the proper landing point. This demonstrates the necessity for having alternate means for signaling aircraft to touchdown points, for the personnel of the transported unit or a unit to be resupplied by helicopter to be familiar with hand and arm signals for bringing them in to land or discharge the sling, and the necessity for pilots to be thoroughly briefed on the objective area prior to being dispatched on the mission. These techniques and procedures are not adequately covered or emphasized in Special Text 57-35-2.

**e. General Considerations**

(1) The 506th Pathfinder Team employed in this exercise is considered the best trained and most effective unit to participate in the exercise. They received many hours of valuable training to include practical work at Fort Benning, Fort McClellan, and Camp Desert Rock. It would be extremely difficult to achieve the degree of combat readiness in any other pathfinder unit that has been achieved by this team by reason of its training and actual participation in an air-landing within the effects range of an atomic detonation. The 506th Pathfinder Team has received the latest and most up to date training available and has operated as a smooth functioning team under actual atomic conditions.

(2) This exercise demonstrated that helicopterborne operations require pathfinder assistance. It also demonstrated that the pathfinder mission requires a trained and skillful team. In consideration of the magnitude of present day Army aviation operations, the many exercises in which pathfinders may participate annually, and the recognized need for training additional pathfinder teams throughout the Army, it is believed that a Pathfinder Team should be retained as an active unit.

**f. Limiting Factors.**

(1) Over-extension of the pathfinder team capabilities as set forth in Special Text 57-35-2.

(2) Inadequacy of doctrinal guidance in Special Text 57-35-2 for task force and helicopter battalion personnel.



#### 4. CONCLUSIONS:

a. A more detailed treatment of the doctrine for pathfinder operations is required in Special Text 57-35-2 to provide guidance to commanders of air transported forces and transporting forces with emphasis on the following:

- (1) Capabilities and limitations of pathfinder units.
- (2) Selection and operation of landing sites.
- (3) Responsibilities and measures to be employed in landing helicopters in the absence of pathfinder units.
- (4) The necessity for detailed briefing of pilots and troop leaders as to the terrain in the objective area prior to assault.

b. With the exception as listed in 4a above, the doctrine as set forth in Special Text 57-35-2, Appendix V, is considered valid.

c. Pathfinders are essential to helicopterborne operations.

d. A Pathfinder Team should be retained as a trained unit for future exercises and as a nucleus for training other pathfinder units.

#### 5. RECOMMENDATIONS: It is recommended that:

a. Appendix V Special Text 57-35-2, be revised as indicated in paragraph 4a above.

b. A pathfinder team be retained intact as a trained unit for future exercises and a nucleus for training other pathfinder units.

#### APPENDIXES: I. Pathfinder Team Organization

#### II. Pathfinder Team Equipment

1. The pathfinder team is composed of one team leader, one team sergeant, and eight team members. The team leader is responsible for the overall operation of the team and for the selection of landing sites. The team sergeant is responsible for the discipline and control of the team members. The team members are responsible for the execution of the team's mission.

2. The pathfinder team is equipped with the following equipment: one team leader's kit, one team sergeant's kit, and eight team members' kits. Each kit contains the necessary equipment for the team's mission, including maps, compasses, and communication equipment.

3. The pathfinder team is trained in the following tasks: selection of landing sites, execution of landing operations, and maintenance of discipline and control of the team members.

4. The pathfinder team is trained in the following tasks: selection of landing sites, execution of landing operations, and maintenance of discipline and control of the team members.

5. The pathfinder team is trained in the following tasks: selection of landing sites, execution of landing operations, and maintenance of discipline and control of the team members.

6. The pathfinder team is trained in the following tasks: selection of landing sites, execution of landing operations, and maintenance of discipline and control of the team members.

7. The pathfinder team is trained in the following tasks: selection of landing sites, execution of landing operations, and maintenance of discipline and control of the team members.

8. The pathfinder team is trained in the following tasks: selection of landing sites, execution of landing operations, and maintenance of discipline and control of the team members.

9. The pathfinder team is trained in the following tasks: selection of landing sites, execution of landing operations, and maintenance of discipline and control of the team members.

10. The pathfinder team is trained in the following tasks: selection of landing sites, execution of landing operations, and maintenance of discipline and control of the team members.

11. The pathfinder team is trained in the following tasks: selection of landing sites, execution of landing operations, and maintenance of discipline and control of the team members.

12. The pathfinder team is trained in the following tasks: selection of landing sites, execution of landing operations, and maintenance of discipline and control of the team members.

(b) Pilots of H-21 aircraft experienced frequent blade stalls when the forward speed of the aircraft was 80 knots or greater in gusty wind conditions. Blade stalls were also found to be induced by con-

Appendix 1 (Pathfinder Team Organization) to Annex J (Phase II - Aerial Movement of a Task Force - Objective 2) to Report of Test Infantry Troop Test Exercise DESERT ROCK VII and VIII

PATHFINDER TEAM ORGANIZATION

1 Lt, Inf, MOS 71542 - Team Leader  
2 Lt, Inf, MOS 71542 - Asst Team Leader  
1 E-6, MOS 133.67 - Team Sgt  
1 E-5, MOS 051.67 - Chief Radio Operator  
1 E-5, MOS 133.67 - Radio-Telephone Operator  
1 E-5, MOS 111.67 - Radio-Telephone Operator  
3 E-4, MOS 051.17 - Radio Operators  
4 E-3, MOS 111.17 - Radio Operators

J-1-1

e. Results of Differential in Cruise Speeds at Combat Load Weights Employed. No differential in cruise speeds were encountered inasmuch as helicopter loads were reduced in order to have a wide safety factor.

Appendix 2 (Pathfinder Team Equipment) to Annex J (Phase II - Aerial Movement of a Task Force - Objective 2) to Report of Test, Infantry Troop Test Exercise DESERT ROCK VII and VIII.

TOGE LINE ITEM NUMBER	ITEM	QUANTITY	USE RATE	REMARKS
108170	Detector Kit, Chemical	1 ea	None	
126600	Mask Protective Field	1 per Indiv		
222752	Compass, Lensatic 5 - 20 MI Grad	1 per Indiv		
250050	Machette, 18", w/case	4 ea		Not needed for desert operations.
251450	Metascope, Type US/F	4 ea	None	Aircraft not equipped with infra-red source.
259900	Protractor, Semicircle, Plastic, 6" Dia.	2 ea		Helicopters did not perform any night training.
286340	Tool Set Pioneer Equipment	2 ea	None	2 Axes, 2 shovels and 2 mattox were used from set.
401176	Bayonet-Knife w/scabbard, carbine	1/Indiv Arm'd w/carbine		
401186	Bayonet-Knife w/scabbard, rifle	1/Indiv Arm'd w/rifle		
404002	Carbine, Cal 30	8 ea		
411747	Demolition Equip. Set Explosive/Initiatingnon-electric	2 ea	None	No demolitions issued or used.
420695	Launcher, Grenade for Rifle M-1	4 ea		

4-2-1

a. Determine an adequate stock level of supplies needed to support H-21 and H-34 type helicopters in desert operations.

b. Establish a more realistic basis for comparison of cargo



TOGE LINE ITEM NUMBER	ITEM	QUANTITY	USE RATE	REMARKS
465390	Watch, Wrist Grade II	2 ea		
560827	Packboard, complete w/attached shoulder pads, strap, quick release	8 ea		
528035	Cutter, Wire w/carrier	6 ea		
525087	Cookset, Mountain w/stove & case	2 ea	None	
538886	Goggles M-1944	8 ea	Dust prevention	
562034	Panel Signal VS-17 GVX	4 ea		
	Anamometer ML-62	1 ea		
602681	Anamometer ML-497	1 ea		
603250	Antenna Equipment RC 292	4 ea	None	
605470	Beacons AN/GVX-1	2 ea	None	No night training conducted.
614990	Emergency Switchboard SB/18 OT	2 ea	None	
616403	Flashlight Baton Type 624010	16 ea	None	
623175	Lantern w/colored lens	13 ea	None	
634600	Radac Detector PP-630/pd	1 ea		Radac equipment was taken out of storage and was in such condition that only signal depot maintenance could repair it. Batteries were not furnished.

<u>TOSE LINE</u> <u>ITEM NUMBER</u>	<u>ITEM</u>	<u>QUANTITY</u>	<u>USE RATE</u>	<u>REMARKS</u>
634630	Radio Set AN/PDR-39	6 ea		Radio equipment was taken out of storage and was in such condition that only signal depot maintenance could repair it. Batteries were not furnished.
639800	Radio Set AN/GRC-9	2 ea	None	Team was too heavily committed to operate this set.
	Radio Set ARC-12	2 ea		
643500	Radio Set AN/PRC-6	9 ea		
643800	Radio Set AN/PRC-10	4 ea		
650100	Radio Set AN/VRQ-3	1 ea	None	
660006	Reel Equipment CE-11	2 ea	None	
668160	Spool DR-8	2 ea	None	
688520	Tool Equipment TR-33	4 ea	None	
698390	Wire WD-1/T-T in wire dispenser MX-306/G	6 ea	None	
401248	Binocular, 6 x 30 Military Reticle	2 ea		
436090	Rifle, US Cal 30	4 ea		
616420	Flashlight MX 991	1 ea	None	

J-2-3

Annex K Phase II - Aerial Movement of a Task Force - Objective 4

1. OBJECTIVE. To determine the adequacy of training guidance set forth in Chapter 7, Special Text 57-35-2 and paragraph 9b of plan of test.

2. TEST FACTORS. a. Initial training level of participating forces.

b. Additional guidance provided to participating units.

c. Pre-training of instructors.

d. Scope of training.

e. Effectiveness of training.

3. DISCUSSION. a. Initial Training Level of Participating Units.

(1) Task Force. 1st Battle Group, 12th Infantry, the parent unit of the participating task force, was organized as a ROCID unit approximately four months prior to initiation of air movement training at Camp Desert Rock. Subsequent to reorganization, 440 basic trainees were assigned to the battle group and trained under applicable ATP's. Reports submitted by the battle group staff indicate that task force units had not completed basic unit training prior to arrival at Camp Desert Rock and that this training was continued concurrently with air movement training and rehearsals for the exercise. Never having had the opportunity to train with helicopter units, officers and key NCO's of the battle group staff and the task force were not completely versed in doctrine, procedures, and techniques for planning and executing a helicopter borne operation.

(2) Transport Aviation Units. Prior to arrival at Camp Desert Rock, the personnel of participating transport aviation units were qualified in the operation and maintenance of their aircraft and were familiar with doctrine, procedures, and techniques for planning and executing a helicopter borne operation. However, the units required experience in conducting desert helicopter borne operations of the nature envisioned in the plan of test.

(3) Pathfinder Team. The pathfinder team was highly trained in pathfinder techniques prior to arrival at Camp Desert Rock and personnel were well versed in doctrine, procedures, and techniques for planning and conducting air landed operations. Personnel had also received two days of radiological training. However they lacked experience in handling more than three or four aircraft at one time and practical work in radiological reconnaissance and reporting.

b. Additional Guidance Provided to Participating Units. (1)

Paragraph 21b of the plan of test recognized the need for preparation of subject schedules by the United States Army Infantry School to amplify guidance set forth in paragraph 9b of the plan of test. Subject schedules were prepared and forwarded to the battle group. In addition, paragraph 21c of the plan of test specified that the Evaluator Group will advise and assist the Test Director in implementation of a training program to familiarize participating personnel at all echelons with the doctrine, tactics, and techniques to be tested. To further provide technical advice and assistance in pre-test training of participating personnel (in compliance with paragraph 4b(2) of plan of test), United States Army Infantry School furnished a representative of the Airborne-Air Mobility Department to The Deputy Test Director for a period of ten days.

K-1



4 hrs 33 min

[illegible]

(2) Guidance was not thoroughly understood by battle group personnel, even after receipt of the referenced subject schedules. The initial weekly training schedules implementing the first week's instruction at Camp Desert Rock failed to correctly reflect the suggested lesson titles, references, and training aids. The training schedule was revised based on recommendations of the Airborne-Air Mobility Department representative.

c. Pre-training of Instructors. (1) Since the block of instruction indicated in the plan of test and in United States Army Infantry School subject schedules for accomplishment by battle group officers and key NCO's at home station was not implemented prior to arrival at Camp Desert Rock, it was necessarily integrated into the training program at Camp Desert Rock.

(2) The 24 hours of instruction on air movement training received by personnel of the participating task force during the initial training week at Camp Desert Rock were presented by instructors from the transport aviation units and the pathfinder team. These instructors were well informed on the subject matter presented, indicating that they had had sufficient instructor training and experience.

d. Scope of Training. (1) Task Force. (a) After arriving at Camp Desert Rock, personnel of the participating task force were given 27 hours of instruction pertaining to air-landed operations as follows:

<u>Hours</u>	<u>Subject</u>
1	Orientation, Organization of H-21 and H-34 Transport Aviation Companies.
1	Flight Safety, Troop Safety.
2	Familiarization with Aircraft.
4.	Loading and Unloading Techniques.
10	Loading and unloading Drill.
3	Loading and Lashing Crew-served Weapons.
4	Orientation Flights.
1	Employment of Pathfinders.
1	Selection of Loading Areas, Communications, and Control Techniques.

(b) In addition to the above instruction, officers and key NCO's were given a 3½ hour conference on the mechanics of planning an air-landed operation by representatives of Airborne-Air Mobility Department, and the transport aviation battalion. This conference covered planning responsibilities, planning sequence, preparation of orders, and air movement forms. This conference was the only formal instruction presented to leaders of the participating task forces and the battle group staff. Results of subsequent planning indicated that staff officers and commanders required additional instruction to attain a firm understanding of doctrine contained in Special Text 57-35-2 and the procedures and techniques of planning an air-landed operation.

(c) In addition to formal training outlined above, the task force conducted exercises and rehearsals as follows:

1. Field exercise involving techniques employed in helicopterborne operations, some of which were conducted using vehicles rather than helicopters due to weather conditions.

2. "Walk-through" rehearsals with helicopters on terrain planned for use during the exercise.

3. Rehearsal on terrain planned for use during the exercise implementing loading plan, air movement plan, and landing plan.

4. Dress rehearsal for the exercise.

5. Rehearsal of alternate plans, using different loading area and landing zone.

(2) Transport Aviation Units. In addition to participating in formal instruction of task force personnel involving the use of helicopters and in all rehearsals, the aviation units conducted comprehensive training in methods of operating in mountainous and desert regions. Included in this training was instruction and practical work on computation of weight and balance in accord with data contained in current technical orders for the type aircraft involved. After technical training and orientation had progressed sufficiently, pilots began flying into landing sites in aircraft without loads. As proficiency improved, aircraft were loaded and flown into high altitude landing sites, individually and in formation. Considerable time was spent on individual approaches until each pilot became highly proficient in landing at high altitudes.

(3) Pathfinder Team. In addition to reviewing previous training, the pathfinder team received 11 days of instruction, including eight days of practical work, in radiological reconnaissance and reporting. The remainder of the training time prior to the conduct of the exercise was used to perfect teamwork and pathfinder techniques and to participate in planning and rehearsals for the exercise.

e. Effectiveness of Training. (1) Task Forces. (a) No pretraining of officers and NCO's in air movement procedures was conducted prior to arrival at Camp Desert Rock. During the initial week of training at Camp Desert Rock, this training was conducted by instructors from the transport aviation battalion and pathfinder team. The instruction was generally satisfactory.

(b) Observation of classes and interviews with individuals of the task force by members of the Evaluator Group indicated that the training was well received, interest was high, and troop attitude during instruction was good. Troop participation during loading and unloading drills was excellent, and it was evident that troops understood loading and unloading procedures. As training progressed, it also became apparent that troops had confidence in the capabilities of the aircraft and pilots. From the results obtained, it appeared that pre-exercise training was adequate in the following subjects:

1. Flight Safety, Troop Safety.

2. Familiarization with Aircraft.

3. Loading and Unloading of Aircraft.

4. Employment of Pathfinders.



(c) Deficiencies noted during pre-exercise training, planning, and conduct of the exercise are as follows:

1. Leaders failed to grasp complete understanding of procedures and techniques for planning an air-landed operation.

2. Key personnel of the battle group needed training in selection of landing sites, marking of landing sites, and techniques used to guide and land helicopters. During the conduct of the exercise, aircraft on resupply missions experienced difficulty in locating separated units of the task force and in landing to discharge supplies or in releasing slings in situations when pathfinder team personnel were not available.

(d) Interviews with unit leaders from task force to squad level after the completion of the exercise indicated that leaders were in common agreement that their unit had received sufficient training to conduct air-landed operations with minimum notice. Interviews with these same individuals indicated a wide difference of opinion as to the amount of training required by a ROCID infantry unit to prepare for an air-landed operation. Recommended hours of instruction ranged from zero to fifty with the average being approximately 20.

(2) Transport Aviation Units. Pilots became increasingly proficient on individual and formation flying at low levels, landings, and take-offs as training and rehearsals progressed. They became well versed in pathfinder techniques and evidenced confidence in the pathfinder teams. Prior to the conduct of the exercise, pilots had become acclimated to operating under desert conditions and proficient in the aerial movement of troops under simulated combat conditions.

(3) Pathfinder Team. The effectiveness of training received by the pathfinder team was evidenced throughout rehearsals and the exercise. The members of the pathfinder team displayed a complete knowledge of pathfinder techniques and were exceptionally proficient in their functions during the conduct of the exercise.

f. Limiting Factors. (1) Guidance in addition to that listed in this objective was provided the participating task force.

(2) The battle group failed to conduct pre-exercise instruction for instructors.

(3) Training emphasis was on the demonstrational aspects of the exercise.

(4) Guidance listed in this objective does not provide for pathfinder training.

4. CONCLUSIONS. a. The guidance contained in Chapter 7, Special Text 57-35-2 and paragraph 9b of the plan of test is adequate, when augmented by appropriate subject schedules and technical advice and assistance of officers skilled in the planning and conduct of air landed operations, with the following exceptions:

(1) Pathfinder training.

(2) Training of selected individuals of the air landed force in selecting and marking landing sites and in the techniques of assisting pilots in landing aircraft and releasing cargo slings.

b. The amount of training, including rehearsals, presented to the participating units was sufficient for the conduct but not the planning of an air movement.

c. Staff officers and leaders of the battle group and participating task force did not attain an adequate understanding of the doctrine contained in Special Text 57-35-2 and the procedures and techniques for planning an air landed operation.

d. Training of all officers and key NCO's in the planning and conduct of air landed operations should be completed prior to the commencement of unit training in this subject.

5. RECOMMENDATIONS: It is recommended that,

a. Appropriate subject schedules for air movement training be made available to all ROCID units.

b. Training guidance for pathfinders be included in Chapter 7, Special Text 57-35-2.

c. Training guidance in Chapter 7, Special Text 57-35-2, include a specific requirement for the training of selected individuals in selecting and marking landing sites and in the techniques of assisting pilots in landing aircraft and releasing cargo slings.

d. Additional training be given to all officers and key NCO's of ROCID units in the planning and conduct of air landed operations in accordance with current doctrine, procedures, and techniques.

Annex L Phase II - Aerial Movement of Task Force - Objective 5

1. OBJECTIVE. To determine if operations as envisioned in Special Text 57-35-2 are inhibited by the employment of two different types of cargo helicopters (H-21 and H-34).

2. TEST FACTORS. a. Comparison of the percentage of time each helicopter by type is out of commission for any cause.

b. Effects on tactical and administrative planning due to different cargo carrying capabilities.

c. Comparative limitations imposed by weather, terrain and conditions of visibility.

d. Comparative limitations in radius of action at combat load weights employed.

e. Results of differential in cruise speeds at combat load weights employed.

3. DISCUSSION. a. Comparison of the percentage of time each helicopter by type is out of commission for any cause.

(1) Helicopter operations under desert conditions create unique maintenance problems. To reduce these problems to a minimum, the helicopter companies assigned to participate in the Infantry Troop Test took certain measures prior to departure from their home stations. These measures included the replacement of all component parts scheduled for change within the next 60 day period, an extensive over-all inspection of aircraft and performance of maintenance as required, and the initiation of supply action to procure all authorized levels of spare parts and supplies. In addition, extra amounts of certain items such as rotor blades, aircraft tires, grease fittings, bushings, bearings, and items of common hardware expected to be used in amounts excessive of normal consumption were requisitioned. Information as to what percentage of requisitioned items were procured and available to the companies for the operation is not available, but interview of the command officers, operation officers and maintenance personnel of the two units indicate that the logistical support received was inadequate for the operation. Personnel further stated that the currently authorized 30 day stock level of spare parts and aircraft supplies was not adequate and recommended that a 45 day stock level be authorized as a minimum level for desert operation.

(2) The majority of problems encountered by maintenance personnel during the operation arose from the effects of terrain and climate on aircraft. The immediate and most pronounced effect was the abrasive action of blowing sand on rotor blade surfaces and the infiltration of dust into all moving parts. Low humidity and extreme temperature ranges further contributed to the rapid deterioration of rotor blades by causing a drying-out of the material and subsequent cracking. This was especially true of the wooden blades installed on the H-21 aircraft, and the situation created an additional logistical problem since blades on this type aircraft are installed in matched sets. Winds of velocities up to 45 knots per hour caused grease in bearings and fittings to become impregnated with particles of sand and caused filters and air intake screens to become clogged. High degrees of temperature caused greases to break down and oil in engines and gear box assemblies to expand. Landings and take-offs on the rocks and shale peculiar to the area caused excessive wear and tear on aircraft tires and contributed to the deterioration of external surfaces of fuselages and rotor blades.



(3) To combat these conditions, extra emphasis was placed on maintenance and especially on the thoroughness of the daily inspections performed by crew members. The scope of these inspections was expanded to include inspection of all moving parts to guard against scoring of metal by particles of dirt, thorough greasing of all fittings and bearings, and minute inspection of rotor blade surfaces for evidence of drying and cracking. Maintenance and replacement of parts was accomplished immediately once the need became known. During the three day period, immediately prior to the exercise, the majority of the aircraft were grounded for inspection and maintenance. This resulted in 100 percent availability of H-21 aircraft and 95 percent availability of H-34 aircraft for participation in the exercise.

b. Effects on Tactical and Administrative Planning due to Different cargo-carrying capabilities.

(1) Effects on Tactical Planning.

(a) The employment of two types of cargo helicopters, each with different cargo carrying capabilities, complicated the tactical planning of the exercise by creating a need for: (1) Determination of type loads that could be transported in each type helicopter; (2) Provision for insuring that loads designed for one type aircraft were not misloaded into aircraft of the other type; (3) Determination of which type helicopter was best suited to transport the assault echelon; (4) Determination of which type helicopter was best suited to transport the supplies and equipment that would accompany the task force into the objective area.

(b) Load weights that could be transported in each type helicopter were dictated by the maximum allowable cargo load each helicopter could safely operate with under existing density altitude conditions. These cargo load weights had been determined during the pre-exercise training period and resulted in each H-21 aircraft transporting ten and each H-34 aircraft carrying eight combat equipped troops during the aerial movement of the task force. These loads reflected the incorporation of a wide safety factor which permitted aircraft to operate with full loads of fuel. This procedure was not in accordance with those outlined in Special Text 37-35-2 which provide for aircraft to carry minimum fuel loads in addition to the reserve, thereby enabling them to carry maximum combat loads. However, the procedure used was satisfactory for this exercise.

(c) Insofar as possible, aircraft serials were composed of only one type of aircraft as the major measure taken to prevent the loading of one type aircraft with loads designed for the other type. Loading of H-21 aircraft with loads designed for H-34 aircraft would have resulted in personnel or equipment not being transported to the objective area. Misloading of aircraft in the one serial that was composed of both types of helicopters was prevented by strict supervision of loading by ground control personnel from the aviation unit.

(d) The conduct of the exercise did not provide for assault and follow-up echelons as such, but had it done so the H-34 type aircraft with its greater cargo carrying capability would have been the logical choice as the aircraft to transport the assault echelon into the objective area.

(e) Its greater cargo carrying capability also made the H-34 type aircraft the logical choice for the aircraft to transport supplies and equipment needed by the task force in the objective area. Furthermore,

it was found during the pre-exercise training period, that the configuration of the H-34 type aircraft permitted more rapid loading of the 106mm recoilless rifles and the 4.2 inch mortars. Consequently, loads including 106mm rifles and 4.2 mortars were carried in H-34 aircraft during the exercise. Transport of crew served weapons as internal loads was considered satisfactory in that it met the purpose of the exercise; however, participating pilots and aviation unit commanders during debriefing interviews recommended the transport of these weapons as external loads in tactical situations to reduce loading and unloading time.

(2) Effects on Administrative Planning. (a) The employment of two types of cargo helicopters, each with a different cargo carrying capacity, affected the administrative planning in much the same way as it affected the tactical planning. However, in addition to the determination of the type and number of aircraft that would execute the supply mission, the transport aviation unit commander was required to plan for refueling and maintenance facilities for each type aircraft involved and for these facilities to be located as far forward as was considered necessary for aircraft to operate with minimum amounts of fuel in addition to the reserve.

(b) All supply missions in the exercise were performed by H-34 type aircraft carrying external loads. The selection of this type of aircraft for the mission was based primarily upon the aircraft's greater cargo carrying capability which reduced the number of aircraft that were required and upon the aircraft's fuel consumption rate, which was less than that of the H-21. Load weights varied between 750 pounds and 1531 pounds.

(c) The fact that aircraft operated with full loads of fuel permitted both types of helicopters to complete their participation in the troop lift and return to the assembly area without refueling. This precluded the need for refueling facilities to be established further forward than the helicopter assembly area. Maintenance facilities were also established in the same area. These procedures were also satisfactory in that they met the purpose of the exercise, but were not in accordance with those outlined in Special Text 57-35-2.

c. Comparative Limitations Imposed by Weather, Terrain, and Conditions of Visibility.

(1) General. The greatest limitation imposed on both the H-34 and the H-21 type helicopters in the exercise was the decrease of load-carrying capabilities with increases of elevation and temperature (density altitude). The average density altitude at which operations were conducted was 8500 feet, and under these conditions it was found that the reductions amounted to approximately 800 pounds for the H-21 type helicopter and 1000 pounds for the H-34. Thus it would appear that the H-21 aircraft were less affected by density altitude considerations, but the H-34 aircraft actually had the greater cargo carrying capability due to the difference in basic operating weights (8400 lbs for H-34 vs. 9400 lbs for H-21) and to the fact that the H-21 must carry a greater amount of fuel because of a higher consumption rate.

(2) Weather. (a) Weather conditions that prevailed throughout the pre-operation training period and during the conduct of the exercise offered little restriction to helicopter operations. Only once, when the wind velocity rose to approximately 45 knots per hour, with a gust spread of 15 knots, was it necessary to cease all helicopter operations. Generally, the pilots of both the H-34 and H-21 aircraft found that the average wind of 20-30 knots per hour velocity aided in landings and take-offs from sites at the average density altitude of 8500 feet.



(b) Pilots of H-21 aircraft experienced frequent blade stalls when the forward speed of the aircraft was 80 knots or greater in gusty wind conditions. Blade stalls were also found to be induced by convective currents when temperatures were above 35 degrees Centigrade (95°F). Maximum efficiency of aircraft operating under these conditions was achieved when forward speeds were restricted to below 75 knots per hour and a power setting of 2500 RPM was maintained.

(3) Terrain. (a) Terrain of the exercise area imposed few limitations to operations of either type of helicopter employed in the exercise. Both experienced the usual problems of maintaining altitude and holding a smooth rate of descent while making approaches to landing sites in mountainous terrain where up-drafts and down-drafts were prevalent, and neither were able to perform either running landings or take-offs because of the rough rocky nature of the ground. The latter condition was a major consideration in the determination of cargo carrying capabilities of each type aircraft, for heavier loads could have been carried had these maneuvers been possible.

(b) Pilots of H-34 aircraft experienced little difficulty in pinnacle and slope operations, but pilots of H-21 aircraft experienced a rolling sensation during cross slope touchdowns. The current technical orders indicate cross slope landing can be effected on slopes up to 20 degrees incline, but it was the opinion of the pilots that the figure is greater than it should be and that the most effective slope landings can be accomplished by landing into the slope with the nose of the aircraft uphill.

(4) Conditions of Visibility. (a) Pilots of neither type helicopter experienced any limitations imposed by conditions of visibility except shortly after the detonation of the atomic device when the dust from the shot mingling with the smoke from burning vegetation forced a change in direction and a reduction in forward speed from the planned 80 knots to an actual 70-75 knots per hour.

(b) No restrictions or limitations on extent of visibility due to configuration of either type of helicopter was reported during the operation except that pilots of H-21 aircraft sometimes found visual selection of touchdown points for the main gear difficult due to the fact that the pilot cannot see the main gear without looking backwards through the pilot's window. This situation could cause vertigo and create a dangerous flight condition. It could be eliminated by the addition of a rearview mirror on the outside of both the pilot's and co-pilot's windows.

(c) In some areas, pilots encountered limited visibility during take-offs and landings because of swirling dust caused by the down wash of the rotor blades. These conditions required merely that the pilot employ more of a maximum performance type of take-off to clear the dust as quickly as possible and that the rotor blade rpm be reduced as quickly as possible following touchdown. This condition did not affect the cargo carrying capabilities of the aircraft.

d. Comparative Limitations in Radius of Action at Combat Load Weight Employed. (1) The nature of the conduct of the exercise precluded the gathering of sufficient information that could form the basis for a comparison of limitations in radius of action for the two types of helicopters employed in the operation. Numerous administrative restrictions required the aircraft to remain on the ground with engines running for extended periods of time and the load weights employed enabled aircraft to operate with full loads of fuel.



e. Results of Differential in Cruise Speeds at Combat Load Weights Employed. No differential in cruise speeds were encountered inasmuch as helicopter loads were reduced in order to have a wide safety factor.

f. Limiting Factors. (1) Employment of a wide safety factor in determination of maximum allowable cargo loads for helicopters operating under existing density altitude conditions.

(2) Administrative restrictions requiring helicopters to remain on the ground with engines running for extended periods of time during conduct of the troop test.

(3) Planning and coordination of the exercise was conducted over a four week period.

(4) H-21 type aircraft were not used to perform supply missions.

4. CONCLUSIONS. a. Tactical and administrative planning was complicated by the necessity of planning for operation, loading and maintenance of both types of helicopters.

b. Operations are complicated by employment of two different types of cargo helicopters because of:

(1) Difference in percent of time each type is out of commission.

(2) Differences in loading capability and techniques.

(3) Differences in logistical support and maintenance required by each type aircraft.

c. The exercise did not provide:

(1) A basis for a true comparison of cargo carrying capabilities of the H-21 and H-34 types aircraft.

(2) A basis for comparison of limitations in radius of action at combat load weights employed.

(3) A basis for determination of results of differential in cruise speeds at combat load weights employed.

d. Operations were not inhibited by comparative limitations imposed by existing weather, terrain, or conditions of visibility.

e. The H-34 type aircraft is better suited for troop transport in assault echelons than the H-21 type.

f. Helicopter operations under desert conditions required greater emphasis on preventive maintenance and closer logistical support than in normal operations.

g. The currently authorized 30 day stock level of spare parts and aircraft supplies in TC 7 & 8 for H-21 and H-34 types aircraft are not adequate for sustained desert operations.

5. RECOMMENDATION. It is recommended that, further tests of helicopter operations under desert conditions be conducted to:

a. Determine an adequate stock level of supplies needed to support H-21 and H-34 type helicopters in desert operations.

b. Establish a more realistic basis for comparison of cargo carrying capabilities of H-21 and H-34 type helicopters.

c. Provide a basis for comparison of limitations in radius of action and differential in cruise speeds at combat load weights employed.

J-2-2

ANNEX M (Phases II and III - Aerial Movement of a Task Force and Aerial Resupply of a Task Force - Objective 6) to Report of Test, Infantry Troop Test, Exercise DESERT ROCK VII and VIII

1. OBJECTIVE:

To compare motor transport with aircraft as the means of transport in the exploitation and resupply phase of tactical operations.

2. TEST FACTORS:

- a. Determination of cost and time factors.
- b. Comparative costs and times of troop transport.
- c. Comparative costs and times of resupply.
- d. Effect of cost and time comparisons.
- e. Overall comparison of aircraft and ground transport.

3. DISCUSSION:

a. See Figure 4, Appendix 1, Annex C for situation in which helicopters were employed.

b. See Appendix 1, Annex D (Detailed Sequence of Events) for times required to deliver supplies by air.

c. Determination of Cost and Time Factors.

(1) See Appendixes 1 and 2 for detailed cost computations for ground transport of troops.

(2) Air transport.

(a) The cost basis for use of helicopters in the troop air lift and resupply was submitted by the 3d Transportation Battalion (Helicopter) (Army) as being an average cost of operating their helicopters for one flying hour. This cost was represented as being \$96.00 per helicopter flying hour, including gasoline, oil and spare parts. Another figure was given as representing a Transportation Research and Development Command cost outlined in Technical Bulletin, January 1956. However, the component costs of this figure could not be determined since the Bulletin was not available to the Evaluator Group.

(b) The time required to airlift troops and supplies was computed as the actual time as recorded from the conduct of the exercise.

(3) Ground transport.

(a) The cost of ground transport was computed for task force organic vehicles augmented by 12-2½ ton trucks and again for task force organic vehicles augmented by 22 armored personnel carriers, M-59. The cost basis was the same as for the aircraft, gasoline, oil and spare parts. The fuel costs were the same as those paid at Camp Desert Rock. The cost of spare parts were as furnished by the Post Ordnance Officer, Camp Irwin, California. The computations as to fuel requirements were extracted from Reference Data, Infantry Division Battle Group, US Army Infantry School, March 1957. Mileage computations were also extracted from this latter source.



(b) The time computations for transport of troops and supplies is based upon the cross country rate of march of wheeled vehicles at eight miles per hour and tracked vehicles at 10 miles per hour. The cross country rate is based upon the assumption few roads would normally exist in terrain of the sort on which this operation was conducted. The distances involved are:

1. For organic vehicles in the transport of troops, the distance from the loading area to the landing zone; eight miles.

2. For nonorganic vehicles used to augment the move, the distance from the division supply and service area to the loading zone, thence to the landing zone; 21 miles.

3. For resupply, the distance from the aerial supply distributing point in the division supply and service area; 21 miles.

(4) A capitulation of the cost factors, distances and rates of movement is as follows:

Cost of:

Gasoline . . . . .	\$0.1825 (gal)
Oil . . . . .	\$0.493 (gal)
1/4 ton truck . . . . .	\$1.00
3/4 ton truck. . . . .	\$1.00
2 1/2 ton truck. . . . .	\$2.25
PC M-59. . . . .	\$3.33

Distances:

From troop assembly area (loading area)	
to landing zone. . . . .	.8 miles
From ASDP and/or division supply and	
service area to landing zone-21 miles	
Rate of march for: (per hour)	
Wheeled vehicles . . . . .	.8 miles
Armored personnel carriers ..	10 miles

d. Comparative Costs and Times of Troop Transport.

(1) The computations below do not include air transported reconnaissance patrols.

(2) Air Transport.

Twenty-four aircraft made two lifts each in a period of 50 min - 1200 min

Five additional aircraft made one lift (last serial) in 10 min - 50 min

Total aircraft minutes required to transport troops . . . . 1250 min  
 Total aircraft hours required to transport troops ..20 hrs. - 50 min  
 Cost of transporting troops, 20 hrs - 50 min X \$96.00 ---- \$2,000.00  
 Actual elapsed time required to conduct troop airlift . . . . 71 min

(3) Wheeled Vehicle Transport.

Forty vehicles traveling eight miles at eight miles per hour . .60 min  
 Plus closing time at close column. . . . . 3 min  
 Total time to transport troops by wheeled vehicles . . . . 63 min  
 Total cost of transporting troops by wheeled vehicles,  
 taken from Appendix 1 . . . . . \$105.95

(4) Armored Personnel Carriers M-59:

Fifty vehicles traveling eight miles at ten miles per hour ... .48 min  
 Plus closing time for 26 wheeled vehicles at close column . . . 2 min  
 Total time to transport troops by armored personnel carriers 50 min  
 Total cost of transporting troops by armored personnel  
 carriers from Appendix 2 . . . . . \$402.00

RECAPITULATION

<u>MEANS EMPLOYED</u>	<u>COST</u>	<u>TIME</u>
Aircraft	\$2000.00	71 min
Wheeled Vehicles	105.95	63 min
Armored Personnel Carriers	402.00	50 min

e. Comparative Costs and Times of Resupply.

(1) Aircraft and truck loading are considered to consume the same amount of time due to special preparation of supplies. Therefore, loading times for automatic resupply were not included in time estimates. Loading of the initial flight of on-call supplies was not considered for the same reason. Sufficient aircraft were available to transport on-call supplies in one lift. However, only three aircraft could be loaded at on time due to restriction of the supply loading site. Demonstrational aspects of the exercise caused further delay in the loading and take off resupply aircraft. It is estimated that a maximum of 15 minutes would be required to load all loads subsequent to the take off of the first flight of three aircraft. Thus, the flying time of 20 minutes plus waiting time for loading is 35 minutes, the total time required to execute the on-call resupply mission. All trucks could load and depart simultaneously on both automatic and on-call resupply.

(2) Aerial resupply:

Thirteen aircraft echeloned in flights of three required an average of 20 minutes per flight from ASDP to landing zone - - - - - 272 min

Total hours required to transport supplies 4 hrs 33 min  
 Cost of transporting supplies 4 hours 33 min X \$96.00 . . . . . \$432.80  
 Actual elapsed time required to conduct:  
 Automatic resupply . . . . . 20 min.  
 On-Call resupply . . . . . 35 min.

(3) Truck, 2½ ton:

One automatic resupply truck traveling 21 miles at eight miles per hour . . . . . 157 min.  
 Three on-call resupply trucks, computed same as above . . . . . 157 min.  
 Total cost of transporting supplies, computed as in Appendix 1:  
 Eighty-four vehicle miles requires 42 gallons of gasoline at .1825 per gallon . . . . . \$7.67  
 Plus oil at .2 gallon per 100 miles at .493 per gallon . . . . . .17  
 Plus spare parts at \$2.25 per day . . . . . \$9.00  
 Total cost of transporting supplies . . . . . \$16.00

RECAPITULATION

<u>MEANS EMPLOYED</u>	<u>COST</u>	<u>TIME</u>
Aircraft	\$432.80	35 min.
Truck 2½ ton	16.84	167 min.

f. Effect of Cost and Time Comparisons.

(1) The following factors are significant in comparing the cost and time of delivery of troops and supplies, assuming that all resupply action to be initiated after completion of the troop delivery:

<u>MEANS</u>	<u>COST</u>	<u>TIME</u>
Helicopter	\$2432.80	106 min.
Wheeled Vehicles	122.79	220 min.
Armored Personnel Carriers (with resupply by 2½ ton trucks)	418.84	205 min.

(2) Assuming that all means were available to the commander and not needed for higher priority missions, and assuming that the mission was within the capabilities of each means employed, the selection of means might well be dictated by economy. Economy of cost obviously favors the use of ground transport. Particularly for long moves, economy of time favors the use of helicopter transport. It must be recognized that selection of the means most economical in dollars and cents over the means most economical in time could result in false economy estimates. Speed of execution and the surprise it affords in a given maneuver may frequently result



in savings in manpower and equipment through rapid neutralization and destruction of the enemy. Selection of a slower means of maneuver, less costly in dollars and cents could result in a greater cost in manpower and equipment before the maneuver is completed.

g. Overall Comparison of Aircraft and Ground Transport.

(1) The concept for employment of helicopters in this operation was based on a rapid moving situation in which the division with an attached helicopter battalion of four companies had committed three battle groups and supporting units, under brigade control, to a flanking maneuver to seize the division objective deep in enemy held territory. The helicopter battalion was in support of the brigade task force when the remaining two battle groups were slowed down in their missions to destroy the enemy directly opposing the division. The enemy was located on commanding terrain awaiting reinforcements to regain the offensive. Therefore, it was imperative that the battle groups increase the momentum of their attacks to complete the destruction of the enemy and thus, provide maximum assistance to the main effort conducted by the brigade task force.

(2) The area to be exploited was precipitous mountains rising to an elevation of 3000 feet from the desert flats which they dominated from three sides. The most critical terrain (QUARTZITE MOUNTAIN) was occupied by the enemy in considerable strength and dominated all approaches available to the battle groups. Helicopters could not be landed on this mountain but they could be landed at the base and on surrounding mesas. In the desert flats adjoining the foothills forward of the enemy defenses was series of interlocking mine fields and obstacles which held up the advance of the two battle groups. The most heavily beleaguered battle group requested and received the support of an air landed reinforced company size task force, to land inside the line of mines and obstacles and conduct an assault on QUARTZITE MOUNTAIN, an objective of the battle group.

(3) The flexibility of helicopter transport was demonstrated by the decision to withdraw two companies from support of the brigade task force for a period of 24 hours in order to lift the company size task force over the obstacles for a rapid assault on a critical objective. Only eight and one-half hours were available to plan and prepare for the assault. Sufficient ground transport to accomplish the mission could have been assembled, including the armored personnel carriers which were attached to the flanking brigade task force, in time, but it is doubtful if this ground transport could have reverted to support of the brigade task force within the 24 hours after completing the troop and supply lift. On the other hand, helicopters could remain in support of the air landed operation for hours after the ground transport would have had to depart.

(4) The helicopters were delayed in initiating the assault because of the susceptibility of the unit assembly area (loading area) and the objective area to smoke and dust cloud effects of the atomic explosion whereas these effects provide concealment to ground vehicular movement. As shown above, both wheeled and tracked vehicles could have delivered the entire force to the landing area more quickly than did the number of helicopters employed, had no mine fields or obstacles been there to impede the movement. It is suggested that breaching of the minefield and launching of the attack immediately after the explosion would have resulted in placing the force in the landing area in position to launch an assault much earlier if ground means were employed rather than helicopters. However, had no delays been occasioned for safety reasons and had there been sufficient helicopters to transport the force in one lift, it could have been accomplished in much less time than by ground transport. This comparison emphasizes the point

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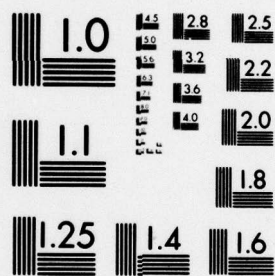
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that for short distances and close-in maneuver, conducted within the effects radius of the atomic preparation such as to reduce visibility and threaten delay of the airlanding, consideration should be given to using ground transport to take advantage of the concealment offered by these effects. This comparison does not, however, fully recognize the problems of obstacles to ground vehicular movement.

(5) The inherent flexibility of the helicopter is realized in its ability to overcome obstacles to surface movement. This flexibility was especially significant in that timely placement of the force at the base of the objective was insured without dependence upon breaching the minefields and obstacle which lay in front of the enemy defenses. Elements of the force could also be placed on top of hills with exposures to precipitous to negotiate by ground transport. Thus emphasis is focused upon helicopters as a means of launching the main action unconditionally by comparison with ground means which frequently depend upon a series of precluding actions.

(6) Speed and surprise, previously mentioned in this annex, are dominant factors in the considerations for selection of transport means. Ground vehicular columns give way the surprise of their movement by creating large dust trails on the desert flats. Movement of ground transport is impeded and often canalized by numerous small ditches, holes, and the soft powdery crust of the desert flats. Ground movement is dependent upon darkness or artificial concealment from the long range observation when traversing the flats to approach the commanding terrain. Helicopters leave no dust trails and are difficult to detect while traversing the flats at 20 to 50 feet altitude until they are within approximately 2000 yards of the landing area. They blend with the desert vegetation and the desert atmospheric conditions make it difficult to detect their sound until they are close at hand. Light transport helicopters can approach the selected position at a speed of 85 to 90 miles per hour as compared to 8 to 10 miles per hour for ground transport. Thus, for speed and surprise the helicopters are ideally suited for rapid exploitation in desert operations by comparison to ground transport.

(7) Resupply operations in the desert are affected by the same comparative factors as is troop transport. The factor of response to requirements further emphasizes the use of helicopters over ground transport. It is recognized that anticipation of supply needs for the most part can be geared to ground transport, assuming no impassable obstacles. However, emergency needs, i.e., replacement of a principle support weapon or critical communications equipment requires the utmost speed of supply action. The nature of desert terrain will frequently dictate locating the supply and evacuation complex much greater than normal distances to the rear. Thus, helicopters can better assure timely supply to the force in the objective area.

g. Limiting factors.

(1) Lack of actual consumption rates and other more complete cost basis.

(2) Lack of opportunity to test ground transport means in conjunction with the air landed operation.

(3) Demonstrational aspects of the exercise.

4. CONCLUSIONS:

a. Helicopterborne assault permits reduction of precluding tactical actions upon which the principle maneuver of a ground attack is frequently dependent.

b. The requirement for speed and surprise in the atomic supported exploitation deemphasizes use of ground transport on the basis of cost alone.

c. The consideration of time in short range atomic exploitation deemphasizes the employment of helicopters when obstacles to ground movement can be bypassed.

d. The results of this exercise are not sufficiently conclusive to substantiate all considerations which should be made in selection of the means to be employed.

e. Comparisons of helicopter and ground transport should be made under tests involving use of both means in sustained operation conditions.

5. RECOMMENDATIONS: It is recommended that,

Comparison of helicopter and ground transport be given a comprehensive test employing both means of transport in sustained operations.



Appendix I (Mechanized Move) to Annex M (Phases II and VIII - Aerial Movement of a Task Force and Aerial Resupply of a Task Force - Objective 6) to Report of Test, Infantry Troop Test Exercise DESERT ROCK VII and VIII

	Nr	Miles Traveled	Vehicle Miles Traveled	Fuel Per 100 Miles Per Veh (Gal) *	Total Fuel (Gal)	Cost Per Gal **	Cost of Spare Parts Per Vehicle Per Day ***	Oil Per 100 Miles (Gal)	Total Oil (Gal)	Cost Per Gal **	Spare Parts	Oil	Fuel	TOTALS
Vehicle 1/4 Ton Fuel	12	3	96	17.75	17.04	.1825		.2	.19	.493			\$3.11	\$ 3.11
Oil			96									.09		.09
Spare Parts	12	1					\$1.00				\$12.00			12.00
Vehicle 3/4 Ton Fuel	13	3	104	31.25	32.5	.1825		.2	.21	.493		.10	5.93	5.93
Oil			104											.10
Spare Parts	13	1					\$1.00				\$13.00			13.00
Vehicle 2 1/4 Ton Fuel	1	8	8	50.0	130.0	.1825		.4	1.04	.493		.51	23.72	23.72
Oil			260											.51
Spare Parts	13	1					\$2.25				\$29.25			29.25
Vehicle PC M-59 Fuel	2	8	16	322.5	51.6	.1825		2.0	.32	.493		.16	9.42	9.42
Oil			16											.16
Spare Parts	2	1					\$3.33				\$ 6.66			6.66
														103.95

\* Fuel consumption rates based on cross-country operations

\*\*\* Cost of spare parts based on maintenance costs at Camp Irwin, California.

\*\* Actual cost of fuel and oil delivered to Camp Desert Rock, Nevada

TOTAL COST MOTORIZED MOVEMENT



Appendix 2 (Mechanized Move) to Annex M (Phases II and VIII - Aerial Movement of a Task Force and Aerial Resupply of a Task Force - Objective 6) to Report of Test, Infantry Troop Test Exercise DESERT ROCK VII and VIII

Vehicle	Nr	Nr Days Each Used	Miles Traveled Per Vehicle	Vehicle Miles Traveled	Fuel Per 100 miles Per Veh (Gal) *	Total Fuel (Gal)	Cost Per Gal **	Spare Parts Per Vehicle Per Day ***	Oil Per 100 Miles (Gal)	Total Oil (Gal)	Cost Per Gal **	COSTS			TOTALS
												Spare Parts	Oil	Fuel	
1/4 Ton Fuel	12		8	96	17.75	17.04	.1825		.2	.19	.493			\$3.11	\$ 3.11
Oil				96									.09		.09
Spare Parts	12	1						\$1.00				\$12.00			12.00
3/4 Ton Fuel	13		8	104	31.25	32.5	.1825		.2	.21	.493		.10	5.93	5.93
Oil				104											.10
Spare Parts	13	1						\$1.00				\$13.00			13.00
2 1/2 Ton Fuel	1		8	8	50.0	4.0	.1825		.4	.03	.493		.02	.73	.73
Oil				8											.02
Spare Parts	1	1						\$2.25				\$2.25			2.25
PC M-59 Fuel	2		8	16	322.5	1540.5	.1825		2.0	9.56	.493			280.14	280.14
Fuel	22		21	462									4.71		4.71
Oil				478											
Spare Parts	24	1						\$3.33				\$79.92			79.92
TOTAL COST OF MECHANIZED MOVEMENT															\$402.00

\* Fuel consumption rates based on cross-country operations

\*\* Actual cost of fuel and oil delivered to Camp Desert Rock, Nevada

\*\*\* Cost of spare parts based on maintenance costs at Camp Irwin, California

ANNEX N (Phase III - Aerial Resupply of a Task Force - Objective 1) to  
Report of Test, Infantry Troop Test Exercise DESERT ROCK VII  
and VIII

1. OBJECTIVE:

To determine the feasibility of command and staff logistical relationship at all echelons of command from division through company as set forth in Special Text 57-35-2 and Supplemental Logistical Instructions USAIS, Annex 4 to Plan of Test.

2. TEST FACTORS:

- a. Organization and functions of logistical elements.
- b. Coordination of logistical elements of staffs concerned.
- c. Adequacy of communication.

3. DISCUSSION:

a. General.

(1) Due to the reduction in the scope of the exercise a provisional logistical support unit was visualized as operating an aerial supply distributing point (ASDP) at division level to support the task force by helicopter. Although specific guidance was lacking in the documents referred to above, this logistical unit followed the procedures and doctrine contained therein as closely as possible.

(2) The ASDP was organized by the provisional logistical support unit which was representative of personnel from the ROCID division. This ASDP controlled an adjacent helicopter loading site where supplies for the task force were loaded on supporting helicopters for delivery.

b. Organization and Functions of Logistical Elements.

(1) For organization of the provisional logistical support unit see Appendix 4, Annex B.

(2) This organization was developed to support a reinforced company size task force within the division with helicopterborne resupply of all classes of supply.

(a) The G4 section received the requests for resupply from the battle group S4 and transmitted them to the ASDP. The ASDP informed the G4 Section of the availability of supplies and at which loading point in the adjacent helicopter landing site the supplies could be picked up. This information, including kind and weight of supplies that would be lifted, was relayed to the supporting helicopter unit for aircraft requirements. When the aircraft took off from the loading point, G4 section was so notified by the aerial supply distributing point officer (ASDPO), or his representative, and the G4 section relayed this information to the battle group logistical control point (LCP), and furnished the above information to the task force. Coordination at division level (provisional logistical support unit) with the battle group commander and staff was very thorough in preparation for the exercise. No spontaneous coordination occurred or was required during the exercise since prior planning and rehearsals prepared the participants to conduct the exercise as a demonstration. For this reason coordination at this level could not be tested.



(b) The battle group S4 planned and requested the loads for resupply of the Task Force, and worked with the planning staff of the exercise in planning and rehearsals of the resupply phase of the problem prior to its conduct. The battle group logistical organization during the exercise consisted of a representative of the Supply and Maintenance Platoon,, acting as the LCP, who received and transmitted requests for aerial supply. The battle group Supply and Maintenance Platoon leader was assigned to the task force for the conduct of the exercise.

c. The logistical personnel in the objective area consisted of the company supply personnel and the Supply and Maintenance Platoon leader from the battle group. Training Text 7-21-2 indicates that the Supply and Maintenance Platoon is capable of terminal guidance for aircraft, but there was no need for the platoon leader's presence in the objective area for that function since pathfinders were available to perform that mission. Assignment of the Supply and Maintenance Platoon leader to a reinforced company size task force while the remainder of the battle group is also in contact with the enemy is not advisable. This submits a key supervisor and coordinator in the battle group to unnecessary hazard and removes him from his primary duties.

d. Prior to the conduct of the exercise, exact supply actions required were rehearsed and arranged to occur without spontaneous reaction on the part of participants. This was for the benefit of spectator interest and news media. It put the exercise on a preplanned demonstration basis which practically negated testing and evaluation of the resupply phase of the exercise. Coordination between task force and battle group was instigated by battle group in that the task force's logistical plans and requirements were planned and established at battle group level. This included plans and requests for diversified loads of supplies.

(1) This is not in conformance with that part of the doctrine which provides that the ground troop commander will plan for his resupply

(2) Coordination at task force level could not be evaluated satisfactorily because of the lack of participation by the task force commander in initiating plans.

e. The Division Aviation Officer was not represented in the logistical planning and conduct of the exercise.

(1) The Division Aviation Officer's staff relationship with supporting and attached Army aviation units is of importance in logistical as well as operational coordination. Specific functions which require further amplification in the doctrine are:

(a) Liaison with supporting or attached Army aviation units.

(b) Selection and designation of landing areas to be used by the units.

(c) Logistical and administrative support of the attached or supporting units.

(d) Method of coordinating schedules of operations.

(e) Establishment of communications between units concerned.

f. Adequacy of Communication.



(1) Communication facilities used in the logistical network were of the type which are organic to the infantry division and consisted of telephone and radio equipment. Observers and news media representatives used the same communication center consisting of AN/GRC 26 with switchboard. The G4 Section was in contact by telephone with battle group LCP, supporting helicopter units, and ASDP; and in radio contact with the battle group LCP.

(2) Radio communication between division G4 section and battle group LCP was not successful at the beginning of the exercise and telephone communication between the two installations was resorted to and maintained throughout the problem.

(3) Only one request from the battle group was submitted to the G4 Section during the exercise. It was received and transmitted to the ASDP by telephone.

(4) The short duration of the problem (four hours) was not conducive to valid testing of the adequacy of communication due to the on-call resupply being delivered on a rehearsed schedule.

**g. Limiting Factors.**

(1) Lack of guidance for establishment of aerial logistical support system at division level.

(2) Adaptation of the exercise as a demonstration.

(3) Planning and rehearsal time for the exercise.

(4) Lack of guidance on staff relationship of the Division Aviation Officer.

(5) Short duration of the exercise.

(6) Lack of task force commander's contribution to the re-supply plan.

**4. CONCLUSIONS:**

a. There is a need for guidance at division level for organization, procedures, and staff relationships incident to operation of an aerial logistical support system.

b. The provisional logistical support unit organized for this exercise is workable under the limited conditions which existed.

c. The short duration of the exercise and its preplanned demonstrational aspect nullified the test validity of command and staff logistical relationships.

**5. RECOMMENDATIONS: It is recommended that:**

a. Special Text 57-35-2 be revised to include guidance on organization, procedures and staff relationship incident to operation of an aerial logistics support system organized and operated by a division from its own resources.

b. The feasibility of command and staff logistical relationship at all echelons of command from division through company level be subjected to appropriate testing.

Annex O (Phase III - Aerial Resupply of a Task Force - Objective 2) to  
Report of Test, Infantry Troop Test Exercise DESERT ROCK VII  
and VIII

1. OBJECTIVE:

To determine whether planning techniques and requisitioning procedures as set forth in Special Text 57-35-2 and Supplemental Logistical Instructions USAIS, Annex IV to Plan of Test are adequate to insure complete and timely logistical support to the airhead.

2. TEST FACTORS:

- a. Reaction to new operational requirements.
- b. Preplanning capabilities.
- c. Promptness in requisitioning.
- d. Promptness in resupply of critical items.

3. DISCUSSION:

a. General.

(1) Due to lack of guidance regarding planning techniques and requisitioning procedures at division level as set forth in documents mentioned in paragraph 1, above, the planning staff for the exercise visualized a provisional logistical support unit organized at division level as shown on Appendix 3 to Annex B. This was to resupply a company size task force from an aerial supply distributing point at division level by the supporting helicopter unit, manned by personnel obtained from the division elements as indicated on Appendix 3 to Annex B.

(2) Procedures for requisitioning adopted for use by the logistical elements participating in the exercise conformed as closely as possible to those contained in doctrine set forth in above references. The procedures used appear to be feasible for use at division level.

(3) Procedures adopted conform to those utilized during resupply operations by surface means except that Corps supported this division's effort with type loads delivered to the division's aerial supply distributing point (ASDP) on trucks to be used to move the loads to helicopter loading points near the ASDP.

b. Reaction to New Operational Requirements.

(1) The problem provided for about seven hours to be available in which to set up the provisional logistical unit and ASDP, including the supplies ready to be loaded onto the aircraft.

(2) The ASDP was organized in that part of the division area from which other division logistical installations had been displacing, and was organized around the division Class I distributing point remaining in that area.

(3) A period for planning and adaptation to the requirement completely negated any evaluation of the reaction to new operational requirements.



**c. Preplanning Capabilities.**

(1) Logistical problems may arise in preplanning loads and having them available for delivery as required by the tactical and logistical situation. Assistance from higher logistical echelons may be required to provide the preplanned, diversified loads if adequate personnel and equipment are not available at division level to assemble and diversify the loads and deliver them to the ASDP.

(2) Timely predesignation of aircraft to be available in the ASDP for lift of automatic resupply resulted in a smooth operation and timely replacement of expended accompanying supplies. Three aircraft occupied the loading points at the ASDP in time to be loaded prior to anticipated take off time. This was particularly necessary in this problem in which an atomic device was fired and the exact time of takeoff could not be announced before conditions were radiologically safe.

(3) The situation in such a problem necessitates delivery of automatic resupply to the ASDP prior to that of the on-call supplies. The reason for this is the little time allowed for planning and preparation of supplies before delivery, particularly if the size of the loading site would not accommodate all required vehicles or supplies.

(4) The demonstrational aspect of the problem, and the time factors involved in preparing the loads and rehearsing their delivery, prevented valid testing of the pre-planning capabilities.

(5) Deputy Exercise Director Headquarters furnished the personnel for operation of the ASDP. These personnel accomplished this operation in addition to their normal duties.

**d. Promptness in Requisitioning.**

(1) Because of the telescoped and preplanned nature of the demonstration no valid test of promptness of requisitioning could be made.

**e. Promptness in Resupply of Critical Items.**

(1) No resupply of critical items was required or requested; therefore, no testing of this aspect could be achieved.

(2) All required actions of the exercise were rehearsed and reviewed to the point where no requisitioning procedure was required. Three loads of automatic supply and ten loads of on-call supplies were lifted and delivered on a prearranged rehearsed schedule which did not require the participants to actually submit a request. This fact and the short duration (4 hours) of the problem negate any valid testing.

**f. Limiting Factors.**

(1) Extensive time period for planning and rehearsals.

(2) Preplanning of the supply procedures.

(3) Short duration of the exercise

(4) Insufficient guidance in Special Text 57-35-2 and Supplemental Logistical Instructions USAIS, Annex IV, Plan of Test, Infantry Battle Group Exercise DESERT ROCK VII AND VIII concerning planning techniques and requisitioning procedures.



**4. CONCLUSIONS:**

a. The techniques and procedures employed in this exercise were workable.

b. Guidance in Special Text 57-35-2 and Supplemental Logistical Instructions USAIS, Annex IV, Plan of Test, Infantry Battle Group Exercise DESERT ROCK VII and VIII, concerning planning techniques and requisitioning procedures from division down through company level, was inadequate for this exercise.

c. The planning techniques and requisitioning procedures contained in Special Text 57-35-2 and Supplemental Logistical Instructions USAIS, Annex IV, Plan of Test, Infantry Battle Group Exercise DESERT ROCK VII and VIII, were not subjected to appropriate testing in this exercise.

**5. RECOMMENDATIONS: It is recommended that:**

a. More specific guidance concerning planning techniques and requisitioning procedures from division down through company level be included in Special Text 57-35-2.

b. The planning techniques and requisitioning procedures contained in Special Text 57-35-2 be subjected to appropriate testing.

Annex P (Phase III - Aerial Resupply of a Task Force - Objective 3) to  
Report of Test, Infantry Troop Test Exercise DESERT ROCK VII and  
VIII

1. OBJECTIVE:

To determine the adequacy of procedures and equipment as set forth in Special Text 57-35-2 and Supplemental Logistical Instructions USAIS, Annex 4 to Plan of Test, for the receipt, preparation, ground handling and storage of supplies.

2. TEST FACTORS:

- a. Organization for the mission.
- b. Amount and type of supplies involved.
- c. Serviceability of supplies when loaded.
- d. Continuity of supply action.

3. DISCUSSION:

- a. Organization for the Mission.

(1) For organization of the provisional logistical support unit see Appendix 4 to Annex B and Appendix 3 to Annex D.

(2) Personnel manning the elements of the support unit acted as their counterparts usually available in the ROCID division. It was recognized that other personnel within the division technical services could be made available to perform the functions as depicted for the provisional unit.

(3) Primary considerations for obtaining personnel for establishment of an aerial supply distributing point (ASDP) as developed for this exercise were:

- (a) Scope of the operation.
- (b) Anticipated duration of the operation.
- (c) Thoroughly trained specialists needed and available.
- (d) Divergent activities or operations of elements of the division.
- (e) Disposition of the division's logistical installations.
- (f) Immediate plans or orders effecting disposition (such as displacement) of the division's logistical elements.
- (g) Time available to establish the ASDP, complete with supplies.

(4) The helicopter landing site adjacent to the ASDP contained four loading points where helicopters could land for loading. One of these loading points was prepared for occupancy by a helicopter to be on standby for emergency use. Each loading point was marked by a numbered canvas panel easily identified from the air.



(4) Transportation and storage of supplies in the ASDP was accomplished by means of tractor-trailer trucks loaded with preplanned loads of supplies from Corps.

(6) All loads of supplies lifted during the exercise were delivered in sling loads by H-34 helicopters.

(7) Troops receiving resupply did not secure the cargo slings and it was necessary for a recovery party of Camp Desert Rock personnel and personnel of the helicopter battalion to return to the objective area to obtain them.

b. Amount and Type of Supplies Involved.

(1) Approximately 27 tons of simulated supplies and actual water were prepared and delivered to the ASDP by vehicles simulated as being from Corps. The supplies remained on the vehicles until loaded on the aircraft.

(2) Approximately 8½ tons of supplies and water were delivered to the objective area by helicopter during the exercise. The supply missions were completed in one hour and forty-three minutes. This consisted of three aircraft with automatic resupply and ten with on-call supply.

(a) The automatic resupply started at 0757 hours and was completed at 0818.

(b) On-call supply mission started at 0829 hours and was completed at 0940.

(3) Use of simulated supplies, other than water, was necessary for the following reasons:

(a) Atomic Energy Commission restrictions on live firing of other than small arms.

(b) Blank ammunition was used by aggressors and the task force, and for safety reasons it was decided that the possibility of troops mixing live and blank ammunition was too great to put live ammunition in the problem. Blank ammunition accompanied the task force into the objective area.

c. Serviceability of Supplies when loaded.

Due to simulation of supplies as noted above, exact serviceability of supplies cannot be reported upon. No broken containers were noted or reported.

d. Continuity of Supply Action.

(1) Supply action was continuous during the exercise after the automatic resupply was initiated. Prior planning and rehearsals enabled all resupply, both automatic and on-call, to be lifted and delivered without being requested.

(2) The demonstration type exercise was not suitable for testing the continuity of supply action, due to the precise preplanning of supply delivery to objective area.



**e. Limiting Factors.**

- (1) Lack of guidance on procedures for aerial supply when initiated at division level.
- (2) Preplanning of logistical play for the exercise.
- (3) Use of simulated supplies.

**4. CONCLUSIONS:**

- a. Adequacy of the exact procedures set forth in references contained in paragraph 1, above, could not be evaluated in this exercise.
- b. Guidance contained in those references was inadequate.

**5. RECOMMENDATIONS: It is recommended that:**

- a. Special Text 57-35-2 be revised to include guidance on procedures for the receipt, preparation, ground handling and storage of supplies.
- b. The adequacy of procedures and equipment for the receipt, preparation, ground handling and storage of supplies be subjected to appropriate testing.

**Annex Q (Phase III - Aerial Resupply of a Task Force - Objective 4) to  
Report of Test, Infantry Troop Test Exercise DESERT ROCK VII and  
VIII**

**1. OBJECTIVE:**

To determine the adequacy of procedures for helicopter transportation and distribution of automatic and on-call follow-up supplies as set forth in Special Text 57-35-2 and Supplemental Logistical Instructions USAIS, Annex 4 to Plan of Test.

**2. TEST FACTORS:**

a. Supply system organization and operation.

b. Technique for obtaining aircraft.

c. Control of aircraft.

d. Compatibility of aircraft with:

(1) Receipt, ground handling and loading techniques.

(2) Unloading, ground handling and distribution techniques.

**3. DISCUSSION:**

a. Supply System Organization and Operation.

(1) See Appendix 4, Annex B for Organization of Logistical Support Unit.

(2) The system organized to accomplish the resupply of the task force by helicopter transportation and distribution of automatic and on-call follow-up supplies was patterned after that outlined in the Supplemental Logistical Instructions USAIS, Annex 4 to the Plan of Test and modified to meet the reduction in scope of the exercise. No Movements Control Center (MCC) or Flight Operations Center (FOC) as such were established. Aircraft and ground movements were initiated by the helicopter unit or ground logistical agency as appropriate, based on instructions issued by the division G4.

(3) The procedure for operation of the supply system provided for initiation of supply action at the lowest user level with requests following the normal ground channels up to division. The G4 section transmitted requirements to the aerial supply distributing point (ASDP) specially organized for this operation and to the helicopter battalion flight operations section, to initiate the resupply mission. Automatic and on-call resupply were planned in advance and aircraft were allocated to the automatic resupply mission.

(4) The communications system provided for wire communication between the G4 section and the flight operations section and for radio communications between the aircraft and both the pathfinder control center and the flight operations section, but on a line of sight basis only.

b. Technique for Obtaining Aircraft.



(1) For demonstrational purposes, automatic resupply was planned to be accomplished by three H-34 type aircraft carrying external loads. Three aircraft were withheld from participation in the troop lift for this purpose and were scheduled to be dispatched by the flight operations section in accordance with a prearranged time for loading. However, instructions from the G4 section called for the aircraft to be dispatched earlier than planned and the aircraft waited at the supply loading site until departing for the objective area. Aircraft were in the loading site a total of one hour and eleven minutes.

(2) The nature of the conduct of the exercise precluded requirements being transmitted for the initial on-call resupply missions since plans called for ten loads to be transported in H-34 type helicopters according to a precise time schedule. The aircraft for these missions were dispatched to the supply loading site in three flight units of three aircraft each following their participation in the troop lift. The tenth helicopter flew alone. Due to the proximity of the helicopter assembly area to the supply loading site, the flight operations officer was able to visually determine when the loaded aircraft departed from the loading site and dispatched succeeding flight units accordingly.

(3) One spontaneous requirement was received for an aircraft to transport 750 pounds of water to a site on Quartzite Mountain. The aircraft was dispatched to the supply loading site but the exercise was terminated before the aircraft departed for the objective area.

(4) The techniques for obtaining aircraft employed varied from those outlined in the Supplemental Logistical Instructions and from those envisioned for use in the exercise but were considered satisfactory to achieve the demonstrational purposes of the exercise.

#### c. Control of Aircraft.

##### (1) At the supply loading site.

The supply loading site contained four loading points each marked with a piece of canvas upon which a large number (1,2,3 or 4) had been painted in bright yellow paint. Due to an administrative restriction imposed by the G4 section, only three of these points were used. Pilots were informed as to which point they would occupy by the flight unit leader while the unit was enroute to the loading site.

##### (2) In-Flight.

In-flight control of aircraft moving to and from the objective area was exercised by the flight unit leader until radio contact with either the pathfinder control center in the objective area or the flight operations section in the helicopter assembly area was established. Aircraft approaching the objective area contacted the pathfinder control center prior to arrival over the release point, from which they were vectored to their respective destinations. A similar procedure was employed when aircraft were returning to the helicopter assembly area.

##### (3) Within the objective area.

(a) Control of aircraft operating within the objective area was exercised by the pathfinder control center. Aircraft were cleared to their respective destinations, which were identified by colored ground panels arranged in a predetermined code letter, and guided to the touch-down points by ground control personnel.



(b) Unloaded aircraft were cleared out of the objective area by the pathfinder control center and proceeded directly to the helicopter assembly area under control of the flight unit leader.

d. Compatibility of Aircraft.

(1) Receipt, ground handling and loading techniques.

(a) Follow-up supplies were transported to the division ASDP where they were held mobile for loading into the helicopters. Vehicles were moved to the loading points, and the amount of ground handling was reduced to removing the preplanned loads from the vehicles and placing them in cargo nets at the loading points. Helicopters were guided to hover over the prepared loads and the cargo nets affixed to the aircraft's cargo hook by the helicopter crew chief.

(b) This method gives the ground handling personnel the opportunity of preparing the load before the aircraft arrives; it takes advantage of the helicopter's ability to hover over a given point; and it reduces the time the helicopter must remain in the supply loading site, thereby permitting more rapid movement of supplies.

(2) Unloading, ground handling and distribution techniques.

(a) The use of external loads as the means of delivering supplies in the objective area precluded the employment of any unloading technique other than guiding the helicopter over the desired delivery point by ground control personnel and the disengaging of the load by the pilot or the crew chief. Ground handling of supplies was to be accomplished by the receiving troops after the helicopter had departed from the site.

(b) This method takes full advantage of the helicopter's ability to hover over a given point and permits delivery of supplies to areas where landings may not be possible. It also reduces to a minimum the time the helicopters must remain in the objective area.

e. Limiting Factors.

(1) Lack of published doctrinal guidance.

(2) No MCC or FOC as such played.

(3) No internal loads transported.

(4) Preplanning and rehearsal of resupply operations.

4. CONCLUSIONS:

a. The techniques and procedures employed in this exercise were satisfactory for the limited conditions under which they were employed.

b. The guidance contained in Special Text 57-35-2 and in the Supplemental Logistical Instructions USAIS, Annex 4 to Plan of Test was inadequate for the planning of helicopter transport of resupply in this exercise.

c. The adequacy of procedures and techniques set forth in these publications cannot be fully determined as a result of this exercise.

d. Ground handling of supplies, and loading and unloading techniques employed in this exercise were compatible with the transportation of external loads by the H-34 type helicopter.

e. Delivery of supplies by external loads affords rapid delivery of loads at destinations.

f. Compatibility of aircraft with loading and unloading techniques of internal loads could not be determined as a result of this exercise.

**5. RECOMMENDATIONS: It is recommended that:**

a. Specific guidance concerning procedures for helicopter transportation of follow-up supplies from division down to company level be included in Special Text 57-35-2.

b. Procedures for helicopter transportation and distribution of automatic and on-call follow-up supplies be subjected to appropriate testing.



**Annex R (Phase III - Aerial Resupply of a Task Force - Objective 5) to  
Report of Test, Infantry Troop Test Exercise DESERT ROCK VII and  
VIII**

**1. OBJECTIVE:**

To determine whether normal medical support, supplemented by helicopter evacuation means, provides for timely evacuation and treatment of casualties from the airhead.

**2. TEST FACTORS:**

a. Computability of aircraft with normal techniques and equipment for loading, unloading, and in-transit treatment of casualties.

b. Time taken to evacuate casualties from point of injury to proper echelon of medical care.

c. Techniques for obtaining aircraft for routine and emergency evacuation of casualties.

d. In-flight control of aircraft, especially with respect to transmission of instructions as to what echelon of medical care patients will be evacuated.

**3. DISCUSSION:**

**a. General.**

Medical support in the exercise consisted of a detachment of one medical officer and 16 enlisted personnel from the battle group medical platoon which accompanied Task Force WARRIOR to the objective area and a simulated division medical clearing station situated at NEWS NOB, 18 miles to the rear. During the course of the exercise, two casualties were simulated, one from the captured Aggressor group and the other from the Canadian Army Platoon. In each case a helicopter was used for evacuation, and casualties were first flown to VIP HILL, where they were observed by military observers and news media personnel and then to the simulated clearing station at NEWS NOB. Neither casualty was a litter patient.

**b. Computability of Aircraft with Normal Techniques and Equipment for Loading, Unloading, and In-transit Treatment of Casualties.**

(1) Both simulated casualties in the exercise were considered ambulatory patients, and as such neither required the use of any equipment nor the employment of loading techniques in loading into or unloading from the helicopters. Neither casualty received in-transit treatment.

(2) Both evacuation missions utilized H-21 type aircraft. Helicopters afford an excellent means of evacuation of casualties from the airhead. Under actual tactical circumstances, evacuation of casualties to a medical facility would be timely and casualties could receive in-transit treatment.

**c. Time Taken to Evacuate Casualties from Point of Injury to Proper Echelon of Medical Care.**



Due to administrative requirements of the exercise, the time taken to evacuate casualties from the point of injury to the site of proper echelon of medical care in this exercise cannot be considered as representative of the time evacuation of actual casualties would consume. For example, a member of the Canadian Army Platoon was declared a casualty at 0806 hours. At 0812 hours the task force commander requested the pathfinder control center to divert one aircraft to landing site HOTEL for casualty evacuation. The request was honored and an aircraft diverted, but upon arrival at the designated site the helicopter was used for transporting of news media personnel instead of carrying out the evacuation mission. A second helicopter was requested and the casualty was evacuated at 0840 hours. He was flown to the observer area and then to the simulated medical clearing station at NEWS NOB, arriving there at 0905 hours. Total time since the casualty was declared - 59 minutes. It is felt that without the administrative restrictions, the casualty could have been delivered to the simulated medical clearing station within 35 minutes from the time he was wounded and could have received in-transit treatment as needed.

**d. Techniques for Obtaining Aircraft for Routine and Emergency Evacuation of Casualties.**

(1) Requests for aircraft to evacuate casualties were submitted to the task force commander by the platoon leader concerned and included information as to the number of casualties to be evacuated and the location of the landing site. The task force commander then requested the pathfinder control center to divert aircraft from those arriving in the landing zone to the designated area to execute the evacuation mission.

(2) This technique was used for emergency evacuation in conformance with paragraph 80, Special Text 57-35-2, which provides for evacuation of casualties by aircraft as expeditiously as possible. Routine evacuation was not played in the exercise and no discussion of techniques for obtaining aircraft is possible.

**e. In-flight control of aircraft, especially with respect to transmission of instructions as to what echelon of medical care patients will be evacuated.**

The nature of the conduct of the exercise and the limited amount of aero-medical evacuation played precluded any transmission of instructions as to what echelon of medical care patients will be evacuated.

**f. Limiting Factors.**

(1) Neither simulated casualty was treated as a litter patient requiring in-transit treatment.

(2) Administrative requirements of the exercise prevented timely evacuation directly to the site of medical facility.

(3) Only H-21 type aircraft were used for evacuation missions.

**4. CONCLUSIONS:**

**a. Helicopters provide a means of timely evacuation of casualties from an airhead to proper medical facility.**

**b. The nature of the conduct of the exercise did not provide for:**

(1) Determination of compatability of aircraft with normal techniques and equipment for loading and unloading of casualties.

(2) Requesting aircraft for routine evacuation of casualties.

(3) Transmission of instructions as to what echelon of medical care patients will be evacuated.

5. RECOMMENDATIONS: It is recommended that:

a. The play of aerial evacuation of casualties in future exercises utilize all types of aircraft employed in the exercise.

b. The number of simulated casualties in future exercises be increased so as to portray a variety of injuries some of which will require in-transit treatment.

c. Future exercises permit more direct evacuation from point of injury to proper medical facilities.

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